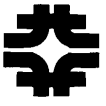
Fermilab Research Program 1993

Workbook

March 1993

Roy Rubinstein



Fermi National Accelerator Laboratory
Batavia, Illinois

Operated by Universities Research Association, Inc.
Under Contract with the United States Department of Energy

Price $5.00

INTRODUCTION

This is the 19th Fermilab Research Program Workbook, originally used as an aid to the Physics Advisory Committee in its annual review of the experimental program at the Laboratory, but long since read by a broader audience. As in the last two years, the "Summaries of Approved Experiments" Section has been expanded to include more information on the current status of experiments, including data analysis, publications and theses. Also as in 1991 and 1992, we have included in that same Section descriptions and status of experiments that have completed data-taking, and are still under analysis.

As always, many people have contributed to this Workbook. I gratefully thank Angela Gonzales, who, as for the past eighteen Workbooks, has done the artwork and many of the figures; Jud Parker, who keeps up the data bases used to provide the information used here; Taiji Yamanouchi, who is Head of the Program Planning Office, and has given assistance and encouragement. Lastly, I am deeply indebted to Jackie Coleman, who typed and put it all together.

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SECTION I. STATISTICS ON FERMILAB PROPOSALS

The status of Fermilab proposals is summarized in this Section of the Workbook. All proposals are classified into one of the following categories:

	Categories	Definitions
Approved Proposals	Completed	Approved proposals that have completed data-taking.
	Remaining	Approved proposals either running or waiting for data-taking.
	Inactive	Approved proposals which are now unlikely to ever be completed.
Pending Proposals	Unconsidered	Relatively new proposals awaiting consideration
	Deferred	Proposals for which consideration has been postponed for a specific reason
	"Not Approved"	Proposals for which a conventional decision cannot be made.
Obsolete Proposals	Rejected	Proposals rejected from further consideration
	Withdrawn/Inactive	Proposals that were not considered at the request of the spokesperson or that are no longer being considered for other reasons.

At the present time, 867 proposals have been received. Table 1 and Figure 1 show the number of proposals in each category each year since 1970.

TABLE 1. STATUS OF PROPOSALS AT FERMILAB

	Aug. 1970	July 1971	July 1972	July 1973	July 1974	July 1975	July 1976	July 1977	July 1978	July 1979	July 1980	July 1981	July 1982	July 1983	July 1984	July 1985	July 1986	July 1987	July 1988	July 1989	July 1990	July 1991	July 1992	Jan 1993
APPROVED PROPOSALS																								
Completed	0	0	0	16	57	97	152	190	234	248	264	278	295	297	300	310	324	326	339	341	348	355	383	389
Remaining and Inactive	21	53	70	75	89	121	100	82	57	52	41	41	29	33	43	48	39	42	34	43	38	34	20	24
Subtotals	21	53	70	91	146	218	252	272	291	300	305	319	324	330	343	358	363	368	373	384	386	389	403	413
PENDING PROPOSALS																								
Unconsidered	23	16	19	10	0	2	6	12	6	6	13	27	16	25	11	8	8	13	13	11	21	50	36	12
Deferred	29	35	39	43	54	45	25	24	11	2	10	7	9	11	2	0	1	0	0	0	0	0	2	3
"Not Approved"	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
Subtotals	52	51	58	53	54	47	31	36	17	8	23	34	26	37	14	9	10	14	14	12	22	51	39	16
OBSOLETE PROPOSALS																								
Rejected	8	15	20	42	65	85	135	166	185	189	191	210	221	229	231	234	236	237	239	241	242	243	245	247
Withdrawn/Inactive	1	33	35	47	61	71	80	93	114	127	131	139	147	149	159	163	166	168	169	168	169	170	173	191
Subtotals	9	48	55	89	126	156	215	259	299	316	322	349	368	378	390	397	402	405	408	409	411	413	418	438
TOTAL NUMBER OF PROPOSALS	82	152	183	233	326	421	498	567	607	624	650	702	718	745	747	764	775	787	795	805	819	853	860	867

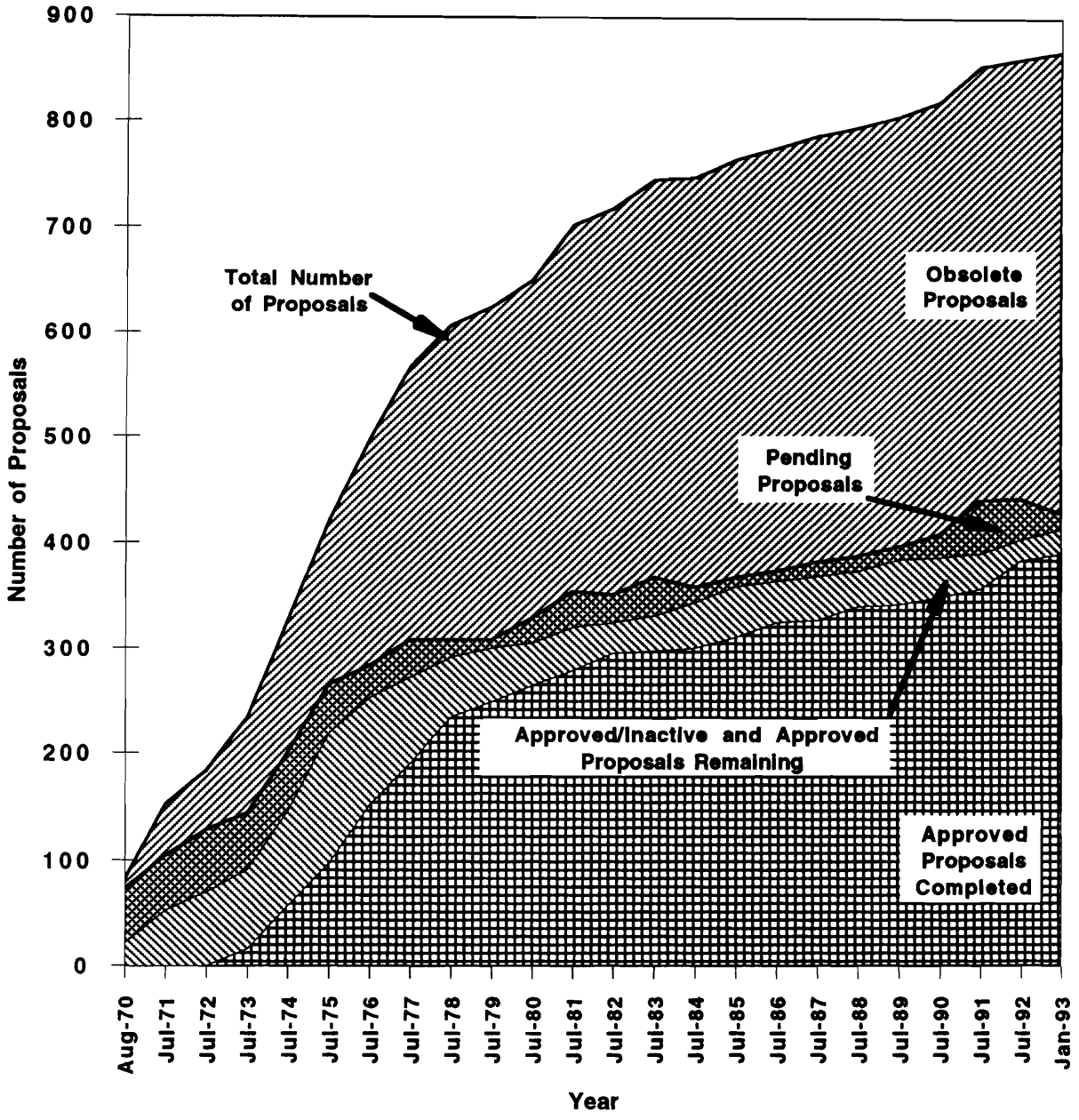


Figure 1. Growth of the Fermilab research program. The total number of approved experiments is obtained by adding the numbers shown as completed and those remaining and approved/inactive. Pending proposals are those which are unconsidered, deferred or "not approved"; obsolete proposals are rejected or withdrawn/inactive.

SECTION II. ACCELERATOR PERFORMANCE

This Section gives summaries of Tevatron operation for the Collider runs of 1988/89 and 1992/93, and also the Fixed Target runs of 1987, 1990 and 1991.

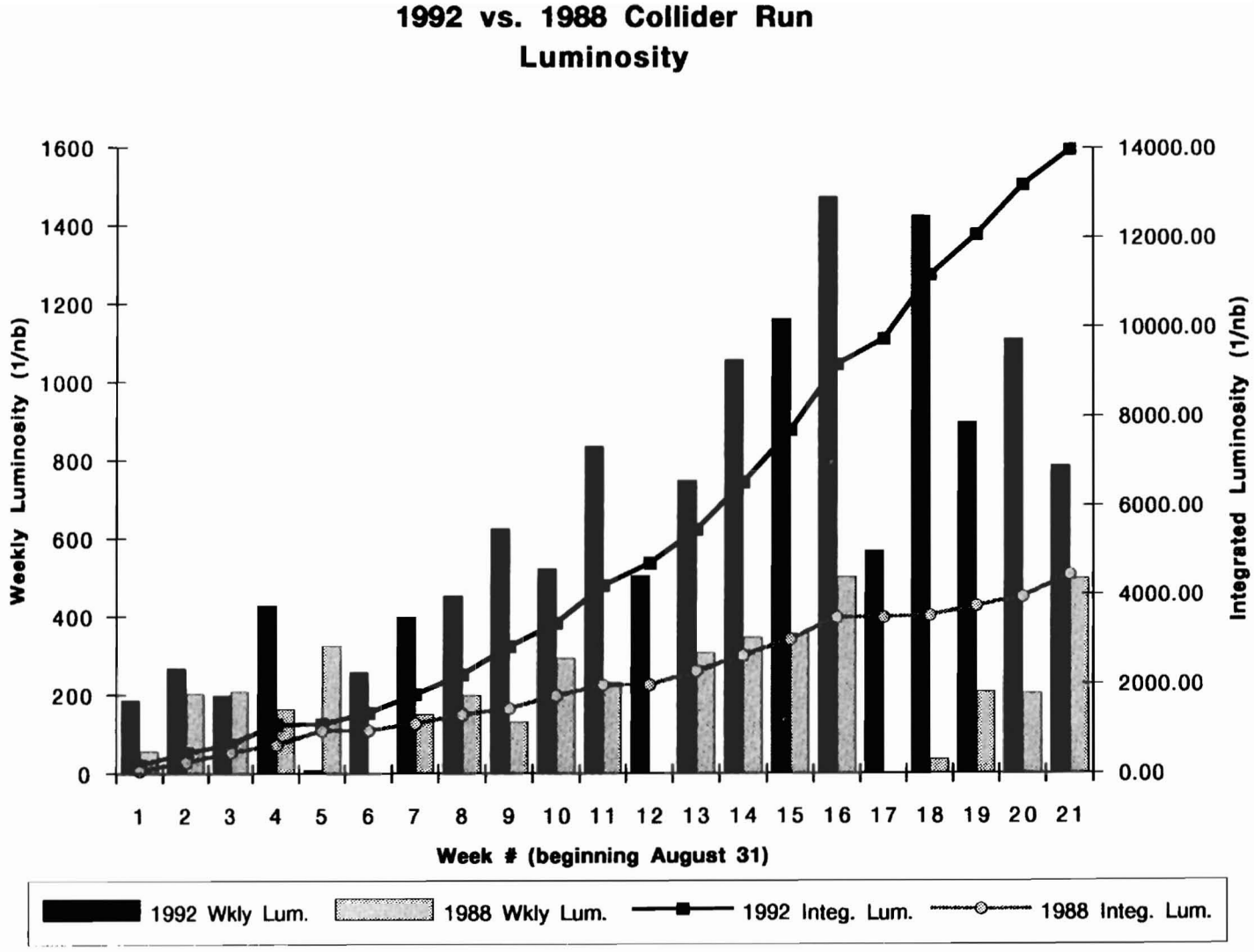


Figure 2. Tevatron Collider operation during the 1988/1989 and 1992/93 running periods - luminosity per week and integrated luminosity.

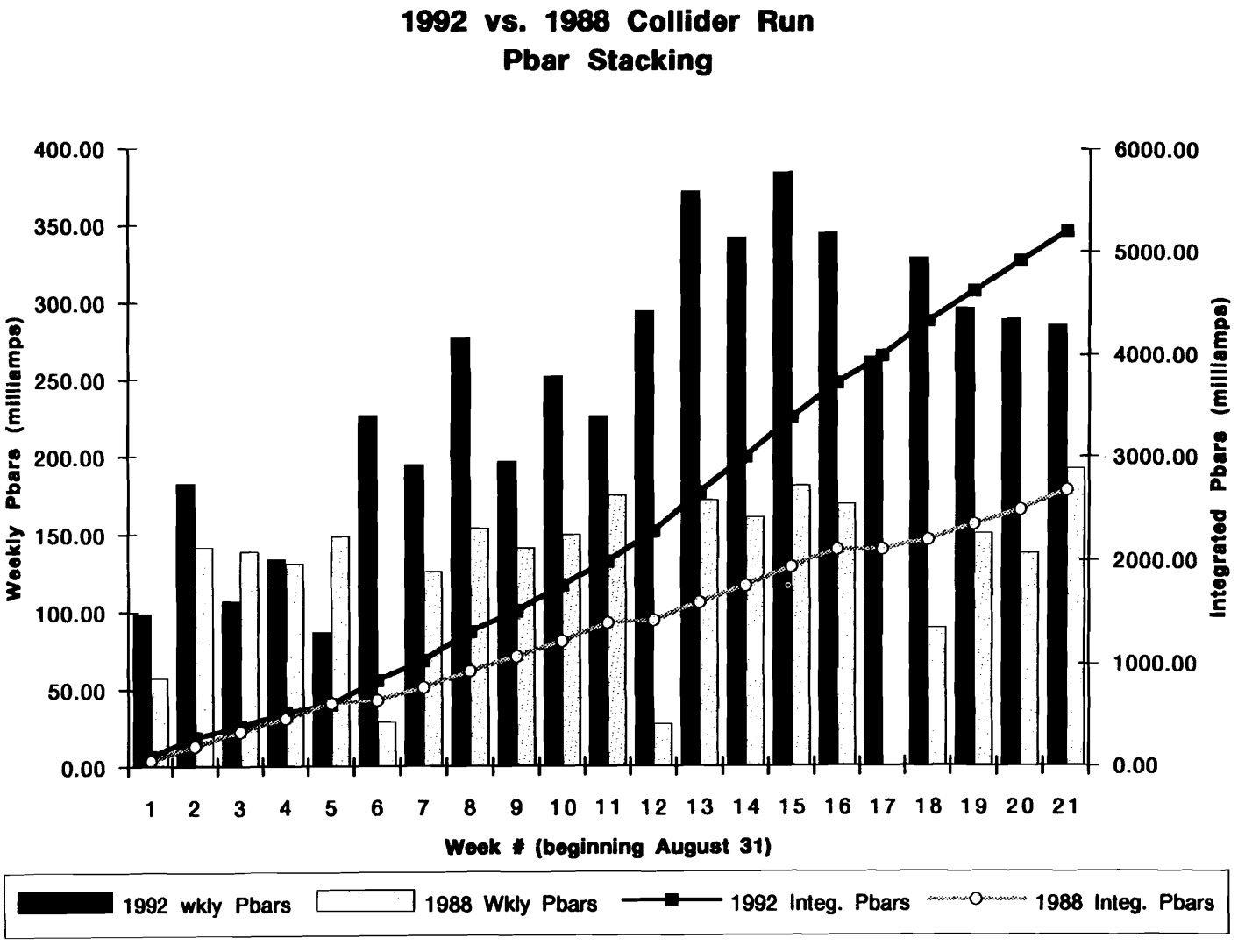


Figure 3. Tevatron Collider operation during the 1988/1989 and 1992/93 running periods - antiproton stacking per week and integrated stacking.

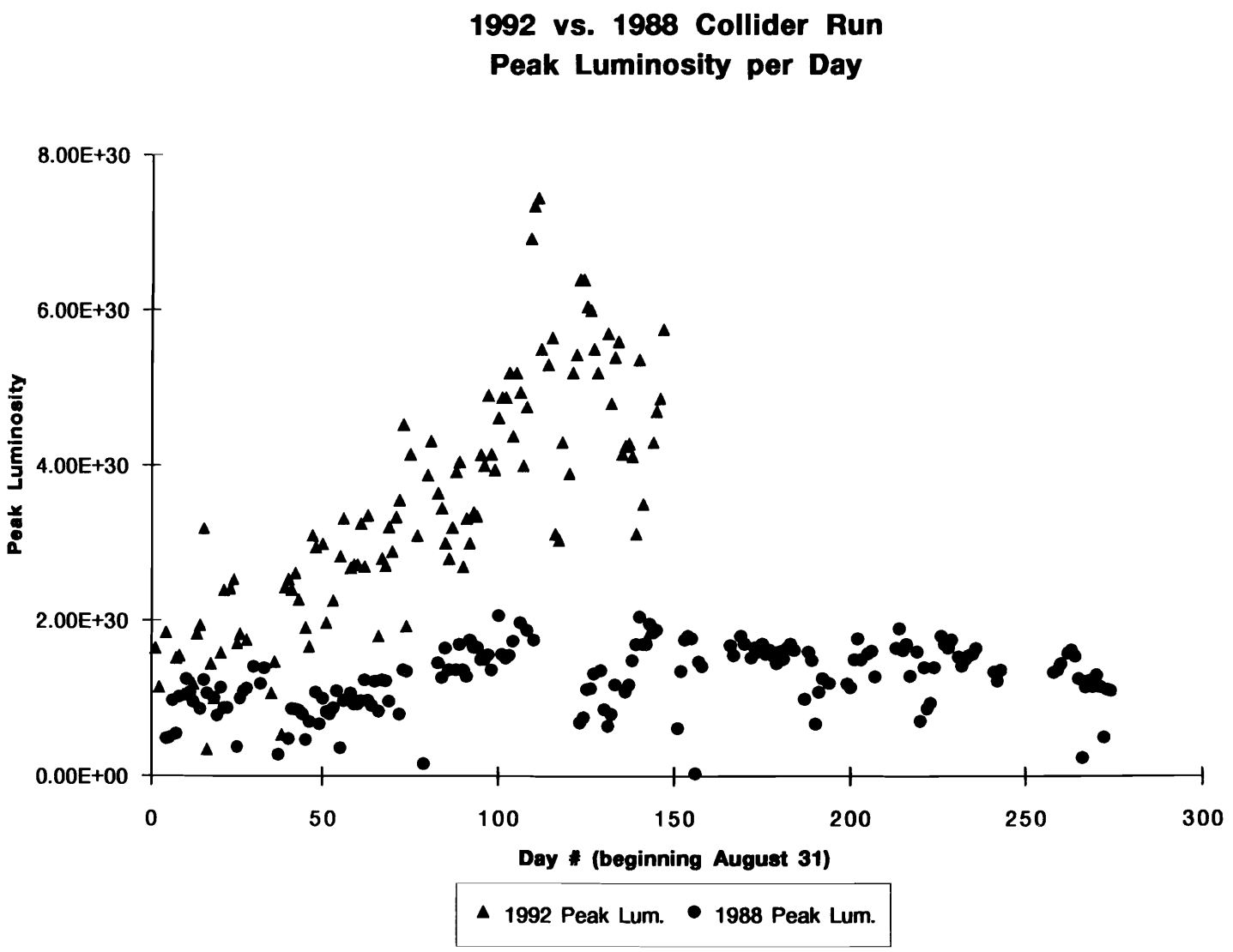


Figure 4. Tevatron Collider operation during the 1988/1989 and 1992/93 running periods - daily peak luminosity.

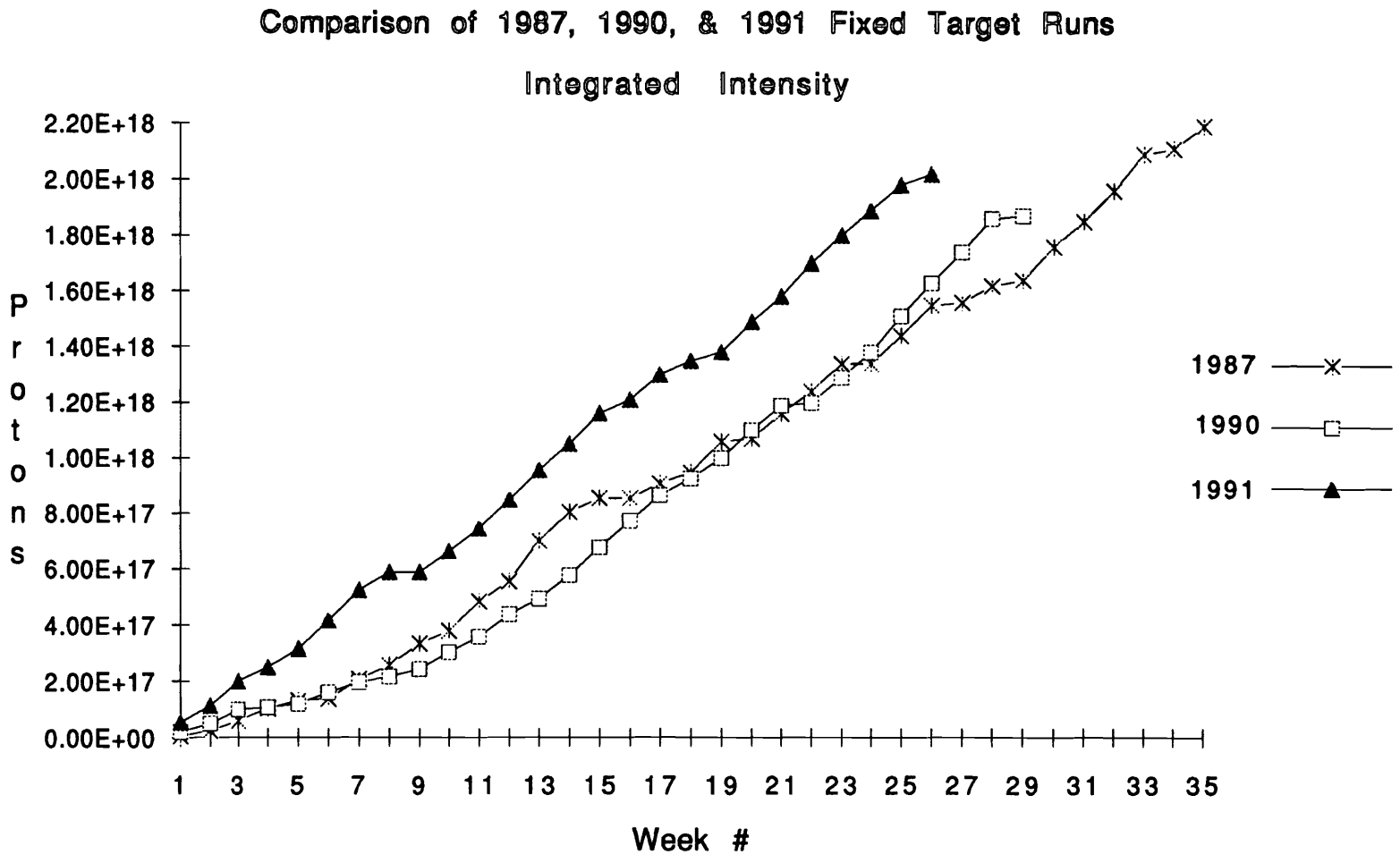


Figure 5. Integrated intensity for the 1987, 1990 and 1991 Fixed Target running periods.

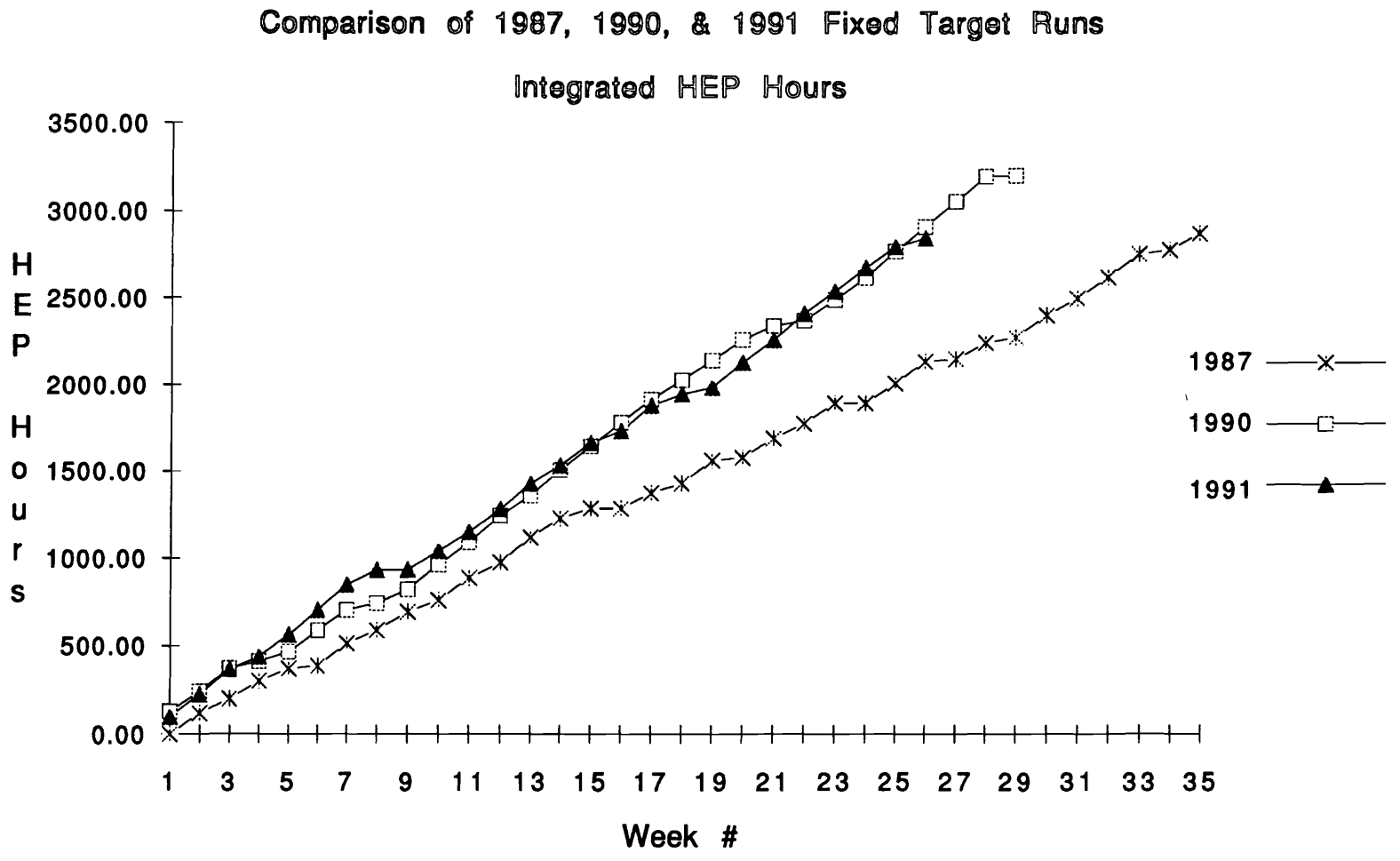


Figure 6. Integrated high energy physics hours for the 1987, 1990 and 1991 Fixed Target running periods.

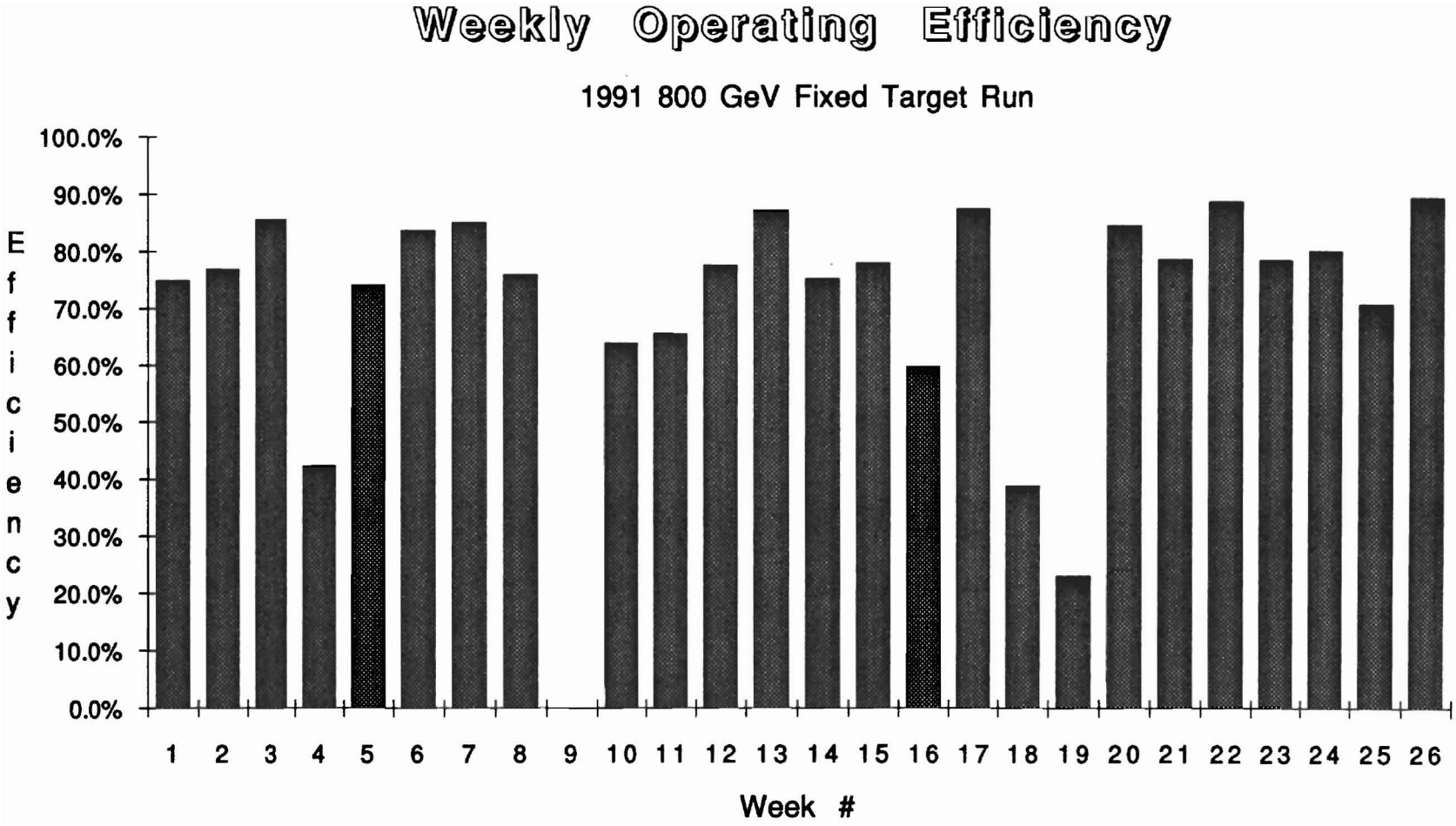


Figure 7. Weekly Operating Efficiency - 1991 Fixed Target Run

SECTION III. FERMILAB BEAM PROPERTIES AND EXPERIMENT LOCATION

Table 2 gives properties of Fermilab beams; their location is shown in Figure 8. The locations of major experiments not yet completed are shown in Figure 9 (Fixed Target) and Figure 10 (Collider and Accumulator). Figures 11-16 give some additional information on beam line particle fluxes (all for 800 GeV incident protons except where indicated).

TABLE 2. FERMILAB BEAM LINE PROPERTIES

Beam	Momentum range (GeV/c)	$\pm\Delta_{p/p}$ (%)	Production angle (mr)	Solid angle (μsr)	Particles	Flux per 10^{12} protons on target*	at (GeV/c)	Comments
PW	925(peak)				π^+,K^+,p	2×10^9	800	High intensity pion beam
		4	1.5		$\pi^-,K^-,\bar{p}$	6×10^8	800	
					$\pi,\bar{p}$	1×10^7	800	Tertiary beams
					p	$1\text{-}4 \times 10^9$	800	Primary protons
PB	500(peak)	12		4	e^-+e^+	$\sim 1 \times 10^8$	350	Wide band charged and neutral beam Also capable of K^o_L, p, and π^-
PE	500(peak)	1.7	0		π^+,K^+,p	$\sim 1.5 \times 10^9$	250	Also provides tagged photons
			0	10.	$\pi^-,K^-,\bar{p}$	$\sim 4 \times 10^7$	500	
PC	1000	16	0-3.5		π^-,K^-,Σ^- Ξ^-,Ω^-	3×10^8	450	Primary protons, neutral and charged hyperons
ME	1000(peak)	0.1			p	$\sim 4 \times 10^{12}$	1000	Primary protons
MP	200	5.0	0 ± 1.0		p	$\sim 10^7$	200	Polarised protons from 800 GeV primary
					$\bar{p}$	$\sim 10^6$		Polarised antiprotons from 800 GeV primary
					π^-	5×10^6		(Average polarisation expected $\sim$ 30%)
MC	50-150		1-6		K^o_L	4×10^6	variable	Neutral beam with 800 GeV primary
					n	1×10^7	variable	
MB	20-200	5.0	2.5		$\pi^\pm$, K	3×10^6	75-100	Low intensity wide-angle test beam
					$e^\pm$	2×10^2	100	
MT	80-245	5.0	0		hadrons	1×10^6	75-245	Test beam
					$e^\pm$	500 500-2500	25 10-150	

MW	1000(peak)	10	0-4		primary p's	2×10^8		
					p	1.3×10^8	500	Beam transport to new
					π^+	2×10^7	500	multiparticle spectrometer;
					K^+	4×10^6	500	assumes 800 GeV on target
					π^-	2.7×10^7	500	
					K^-	8×10^5	500	
					$\bar{p}$	8×10^4	500	
NW	10-150	2	0-1	4-16	μ^-			Currently a test beam, intensity limited
					π^-	4×10^6	$\sim$ 100	
					e^-	6×10^4	$\sim$ 100	
NC-D	750(peak)	10	0	0.6	$\nu/\bar{\nu}$	5×10^6 ν/m^{2**}	500	Narrow band, sign-selected neutrino beam
NC-T	1000(peak)	100	0	6.0	$\nu/\bar{\nu}$	1.4×10^8 ν/m^{2**}	0-800	Broad band, quadrupole focus
NE	1000				p	1×10^9	800	To Labs G and D
	25-700	3.3	2	0.2	π^-	5×10^5	600	
NT	25-300	4.75	0-6	0.7	hadrons	$\sim 1 \times 10^6$	450	Test and calibration beam to Lab E neutrino detector and Lab F
NK	25-225	3.2	0-6	0.6	muons	5×10^3	225	Muon beam to Lab F
NM	100-700	14			$\mu\pm$	$\sim 10^7$	500	Tevatron muon beam
NM (test	2.5-200	30	0		hadrons	$\sim 2 \times 10^4$		Test beams to muon spectrometer
modes)	5-200	30	0		electrons	$\sim 10^3$		

* For 800 GeV protons incident unless otherwise noted. Current beam spill is 23 sec, and cycle time is $\sim$ 59 sec.

** Beam spill times variable ($\sim$ 1ms to 20 sec). Typically 3 fast pings available per accelerator cycle.

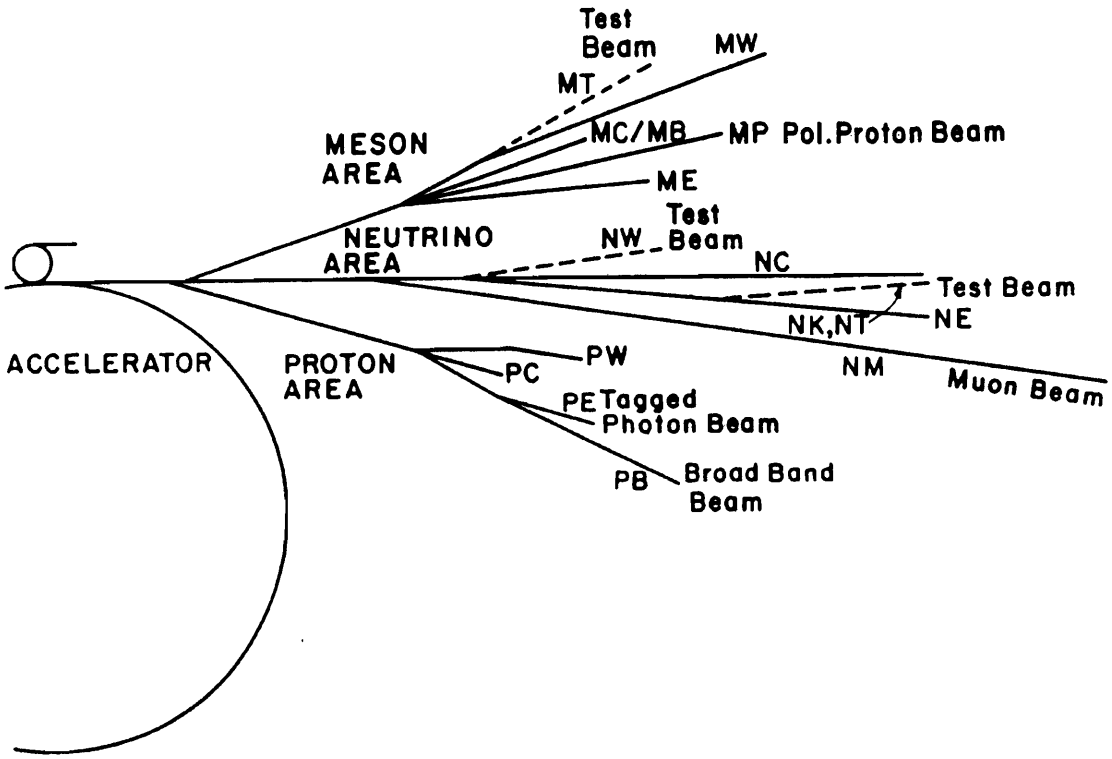


Figure 8. Layout of Fermilab Fixed Target beams. Properties of individual beams are given in Table 2.

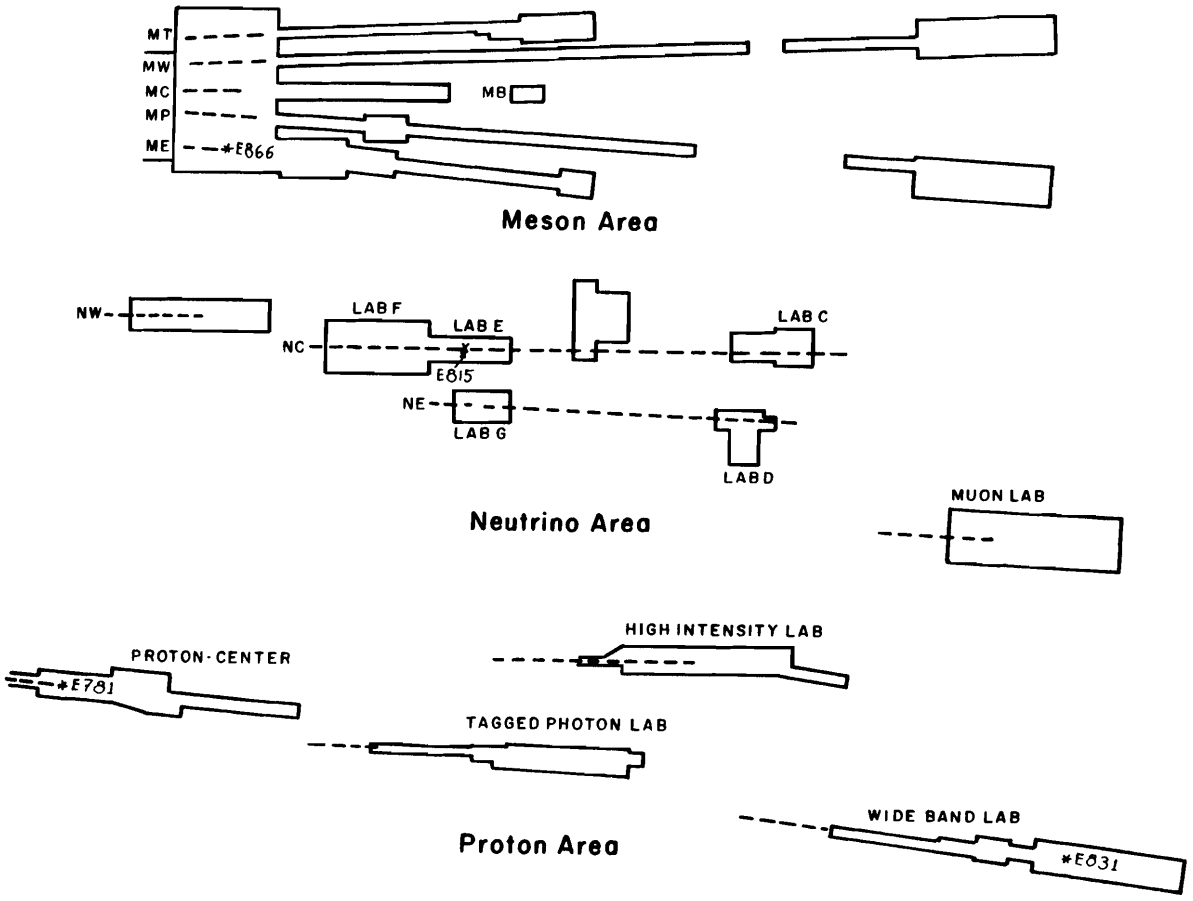


Figure 9. Schematic of the Fixed Target experimental areas with locations of major experiments currently approved for the next Fixed Target run. Not shown are experiments E-799 and E-832, for which a location has not yet been determined. The drawings are not to scale.

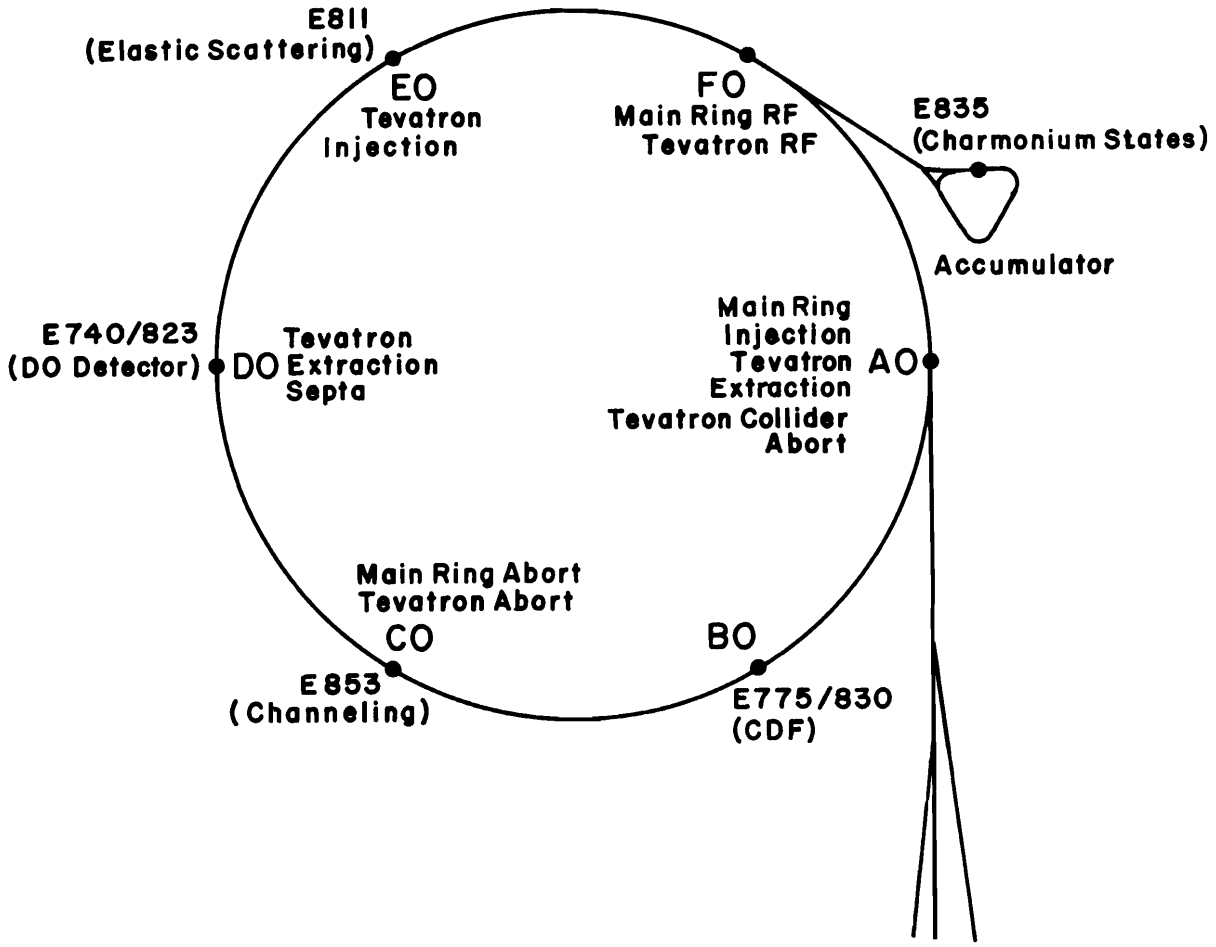


Figure 10. Locations in the Tevatron of the approved $p\bar{p}$ Collider experiments, the channeling experiment, and the gas jet experiment in the Accumulator.

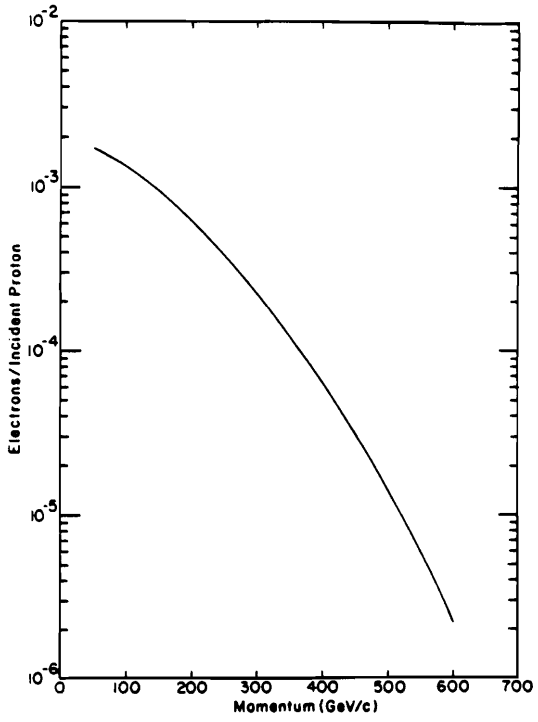


Figure 11.

Proton Area: Electron flux in the Proton Area Wide Band Beam; double band using a deuterium production target.

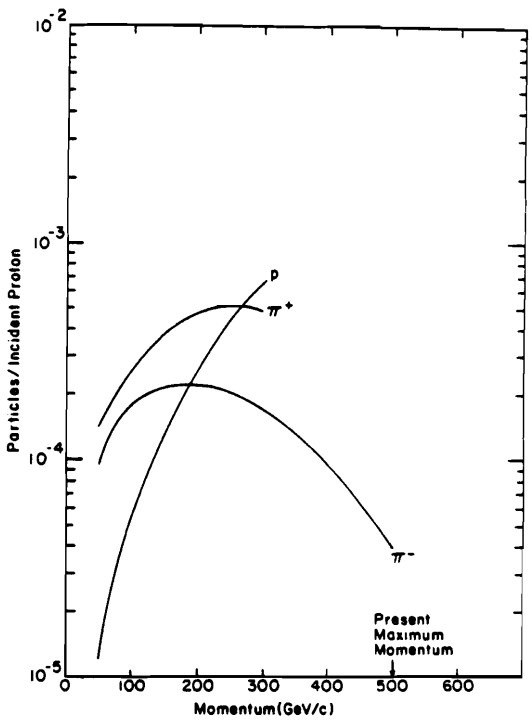


Figure 12.

Proton Area: Hadron flux in the Tagged Photon Laboratory.

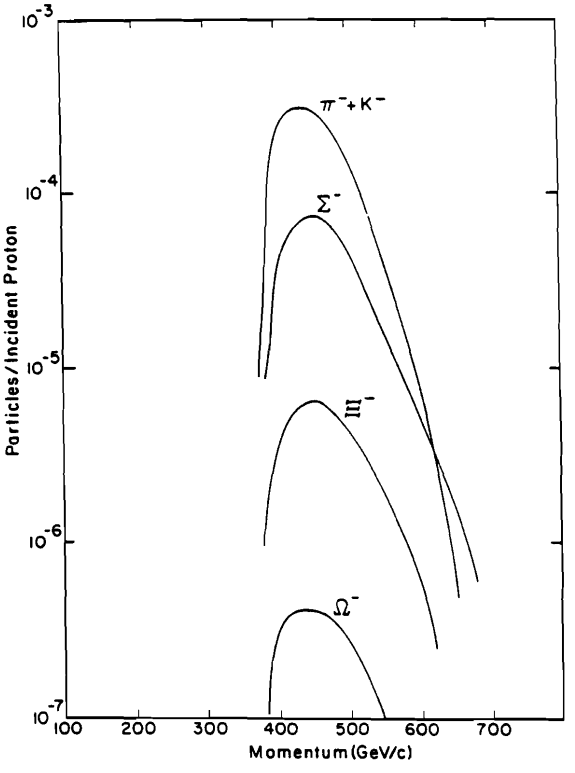


Figure 13.

Proton Area: Fluxes in the Proton Center Hyperon Facility.

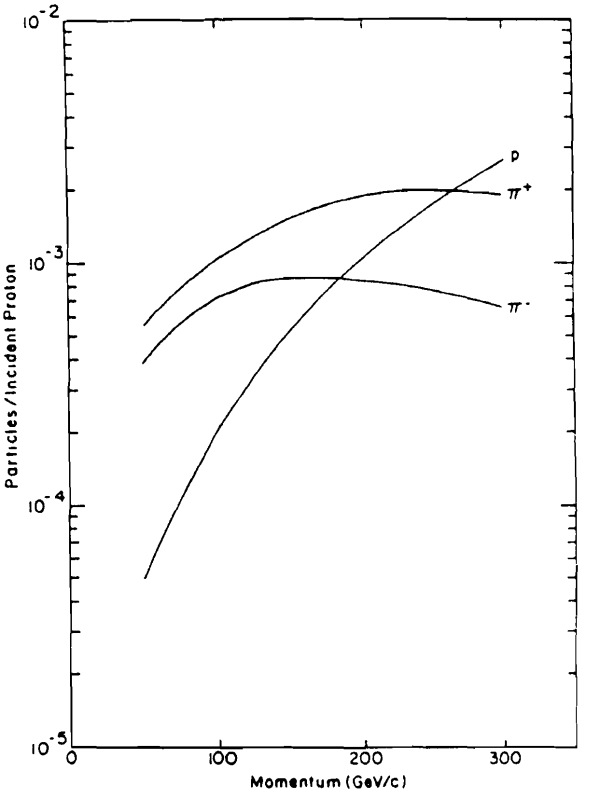


Figure 14.

Proton Area: Proton West High Intensity Laboratory particle flux.

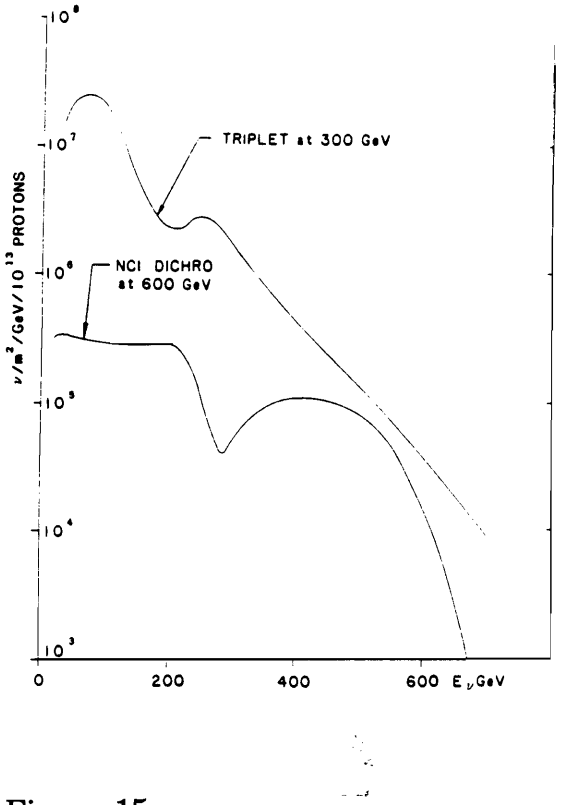


Figure 15.

Neutrino Area: Fluxes at Lab C with the dichromatic and triplet neutrino beams, for 1000 GeV incident protons. Assumed detector radius is one meter.

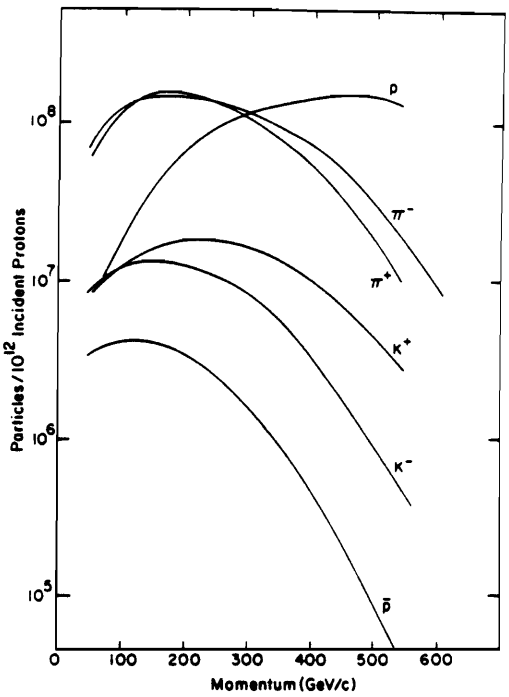


Figure 16.

Meson Area: Fluxes in the MW beam line. Production angle for negatives is zero degrees; for positives it is 1.4 mr.

SECTION IV. FERMILAB COMPUTING FACILITIES

We include in this Section information on recent Fermilab computing usage.

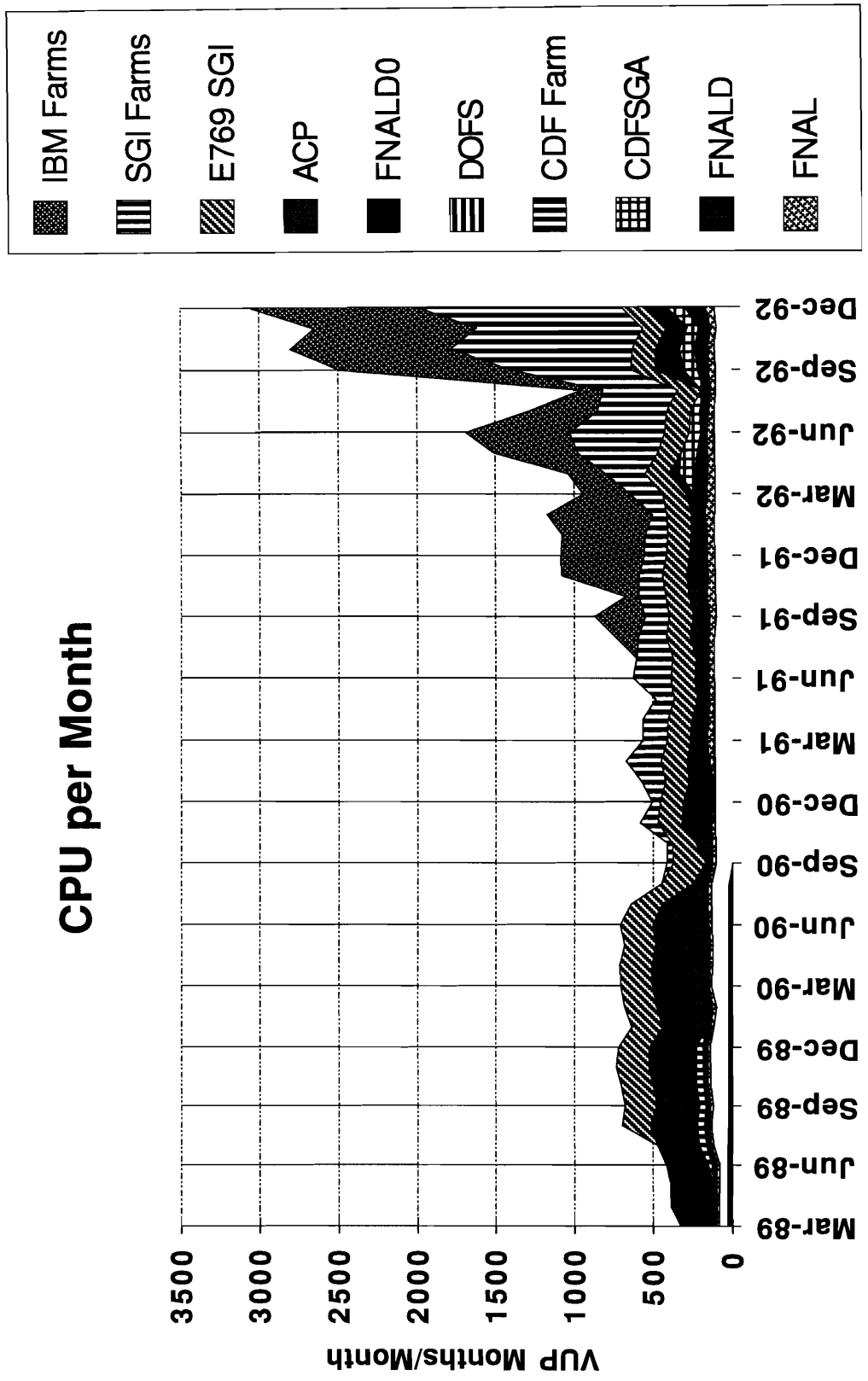
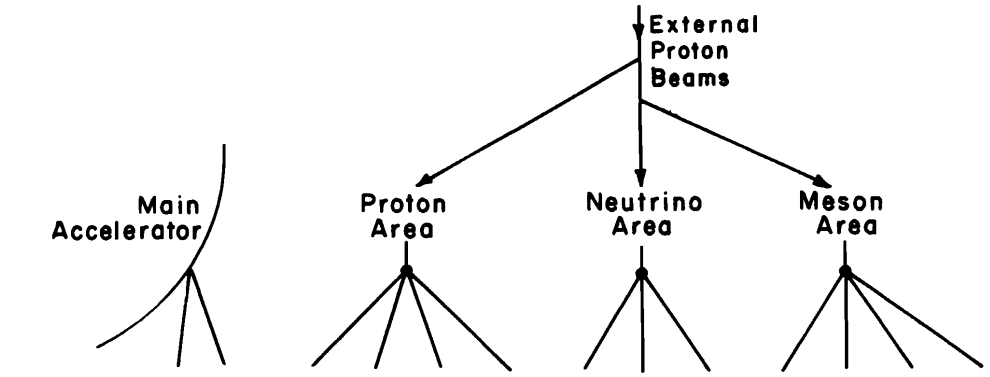


Figure 17. Fermilab computing usage (Vax equivalents).

SECTION V. MAJOR RESEARCH ACTIVITIES DURING 1992 AND 1993

Information on the Fermilab Research Program during the 1992/93 Collider run is given in the following pages. Figure 18 shows when the run took place; Table 3 describes the major research activities in a little more detail.



Month	BO	DO	PB	PE	PC	PW	NM	NE	NC	ME	MC	MW	MT	Comments
January 1992														
February														Accelerator Shutdown
March														
April														
May														
June														
July														Accelerator Startup
August														
September	775 /830	740 /823												
October														900x900 GeV Collider Run
November														
December														
January 1993														
February														

Figure 18. Major experiments running at Fermilab in 1992 and 1993 (through February).

TABLE 3. DESCRIPTION OF MAJOR RESEARCH ACTIVITIES DURING 1992 AND EARLY 1993

EXP. #	AREA
	COLLIDER
740 / 823	Studies of 900×900 GeV $\bar{p}p$ collisions using the D0 detector - setup and data-taking
775 / 830	Studies of 900×900 GeV $\bar{p}p$ collisions using the CDF detector - setup and data-taking

SECTION VI. FERMILAB RESEARCH PROGRAM

This Section contains information on the Fermilab research program for the next few years. The Situation Report, given on page 30, is a summary of the current status of the experimental program. Figure 19, based on the Situation Report, illustrates by beam line the major approved experiments.

Fermi National Accelerator Laboratory
Experimental Program Situation Report as of February 4, 1993

The Experimental Program situation at Fermilab is summarized below. The experiments are listed by experimental area and beamline under categories that best describe their status as of February 4, 1993 . For experiments which have completed or received beam, the amount of running time or exposure to date is listed. The experimental area names are abbreviated as follows: Meson Area (MA); Neutrino Area (NA); Proton Area (PA); Collision Area (COL); Accumulator Ring (ACCUM RING); Debuncher Ring (DBNCHR RING); and Unspecified (UNSPEC BEAM).

Total number of approved experiments - 413

Beam Area & Line		Experiment	Spokesperson(s)	
(Only experiments which have completed data taking since January 1, 1991 are listed.)				
A. Experiments that have completed data taking (389)				**Completed**
MA	ME	B-QUARK MESONS & BARYONS #789	Kaplan, Peng	Jan 8, 1992
	MP	SPAGHETTI CALORIMETRY TEST #840	Para	Jan 8, 1992
		TRD/SHOWER COUNTER TEST #844	Swordy	Dec 26, 1991
	MC	ETA00 & ETA+- PHASE DIFFERENCE #773	Gollin	Sep 30, 1991
	MT	WARM LIQUID CALORIMETRY TEST #795	Pripstein	Dec 23, 1991
		CALORIMETER BEAM TEST #T841	Price	Jan 8, 1992
	MW	HADRON JETS #672A	Zieminski	Jan 8, 1992
		DIRECT PHOTON PRODUCTION #706	Slattery	Jan 8, 1992
NA	NM	TEVATRON MUON #665	Schellman	Jan 8, 1992
		MUONS IN EMULSION #802	Chatterjee, Ghosh	Dec 30, 1991
		SDC DETECTOR MUON BEAM TESTS #T816	Lubatti	Jan 8, 1992
		EMPACT DETECTOR TEST FOR SSC #819	Osborne	Oct 15, 1991
		FIBER TRACKING TEST #839	Margulies	Jan 8, 1992
		EMULSION EXPOSURE 600 GeV #843	Kim	Jul 13, 1991
		PIXEL DETECTOR TEST #T852	Arens	Dec 23, 1991
		dE/dx MUONS #855	Kalbfleisch	Jan 8, 1992
		INTEGRATED PIXEL DETECTOR TEST#856	Parker	Jan 8, 1992
	NE	PARTICLE SEARCH #690	Knapp	Jan 8, 1992
	NT	GAS CALORIMETRY FOR SDC #848	Giokaris	Dec 23, 1991
		BARIUM FLUORIDE CALORIMETER #849	Kobrak	Jan 8, 1992
	NW	NEUTRON MEASUREMENTS AT NWA #T821	Johns	Jan 8, 1992
PA	PE	HADROPRODUCTION HEAVY FLAVORS #791	Appel, Purohit	Jan 8, 1992
	PB	PHOTOPRODUCTION OF JETS #683	Corcoran	Jan 8, 1992
		PHOTOPRODUCTION OF CHARM AND B #687	Butler, Cumalat	Jan 8, 1992
		RADIATION EXPOSURE #842	Underwood	Jan 8, 1992
	PC	MAGNETIC MOMENT #800	Johns, Rameika	Jan 8, 1992
	PW	BEAUTY PRODUCTION BY PROTONS #771	Cox	Jan 8, 1992
COL	C-0	FIBER IRRADIATION STUDIES #851	Margulies, Piekarz	Jan 8, 1992
	OTHER	MAGNET APERTURE STUDIES #778	Gerig, Talman	Jan 21, 1991
DBNCHR	RING	MUON FLUXES IN THE DEBUNCHER #854	Bross	Jan 8, 1992
ACCUM	RING	CHARMONIUM STATES #760	Cester	Jan 10, 1992
		ANTIPROTON DECAY #T861	Geer	Oct 29, 1992
UNSPEC	BEAM	BOTTOM AT THE COLLIDER #784	Lockyer	Jan 8, 1992
		CALORIMETER TEST #847	Sulak	Jan 8, 1992
B. Experiments that are in progress (3)				**Recent Run**
MA	MC	CP VIOLATION #799	Wah, Yamanaka	Jan 8, 1992
COL	B-0	CDF UPGRADE #775	Shochet, Carithers	Oct 31, 1992
	D-0	D-0 DETECTOR #740	Grannis	Oct 31, 1992
E. Experiments to be set up within a year (2)				
COL	C-0	TEVATRON CRYSTAL EXTRACTION #853	Murphy	
	E-0	PBAR P ELASTIC SCATTERING #811	Orear	
F. Other approved experiments (9)				
MA	ME	ANTI(U-QUARK)/ANTI(D-QUARK) DIST#866	Garvey	
NA	NC	NEUTRINO #815	Shaevitz	
PA	PB	HEAVY QUARK PHOTOPRODUCTION #831	Cumalat	
	PC	LARGE-X BARYON SPECTROMETER#781	Russ	
	OTHER	EMULSION EXPOSURE 1000 GeV #793	Lord	
COL	B-0	CDF UPGRADE #830	Shochet, Carithers	
	D-0	D-0 DETECTOR UPGRADE #823	Grannis	
ACCUM	RING	CHARMONIUM STATES #835	Cester	
UNSPEC	BEAM	CP VIOLATION #832	Hsiung, Winstein	
Pending proposals (15)				
MA	ME	LOW-MULTIPLICITY BEAUTY DECAYS #865	Kaplan	
	MC	K-SHORT DECAYS #833	Thomson	
PA	PE	HEAVY FLAVORS AT TPL #829	Appel, Purohit	
	PC	CP VIOLATION #796	Thomson	
	PW	HIDDEN CHARM AND BEAUTY #867	Cox	
COL	C-0	MAXIMUM ACCEPTANCE DETECTOR #864	Bjorken, Longo	
DBNCHR	RING	SEARCH FOR NEUTRINO OSCILLATIONS#860	Lee	
ACCUM	RING	CPT AND GRAVITY TESTS #812	Smith	
		ANTI-HYDROGEN DETECTION #862	Munger	
UNSPEC	BEAM	SMALL PHYSICS #813	Jones	
		MUON NEUTRINO MAGNETIC MOMENT #820	Giokaris	
		CP VIOLATION IN HYPERON DECAY #859	Hsueh	
MAIN	INJECTOR	NEUTRINO OSCILLATIONS #803	Reay	
		KAON PHYSICS AT MAIN INJECTOR #804	Winstein	
		SOUDAN NEUTRINO OSCILLATIONS #822	Goodman	

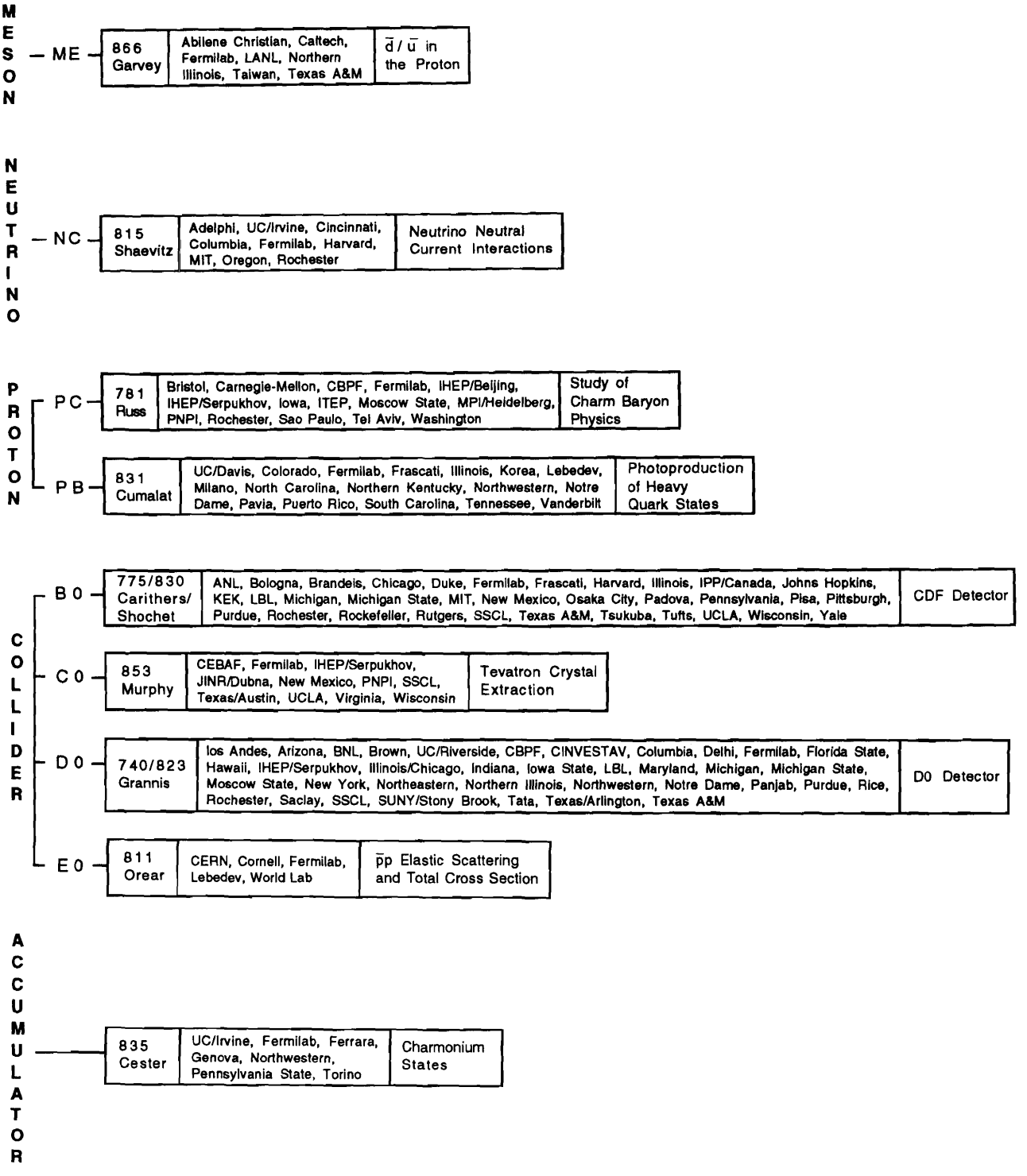
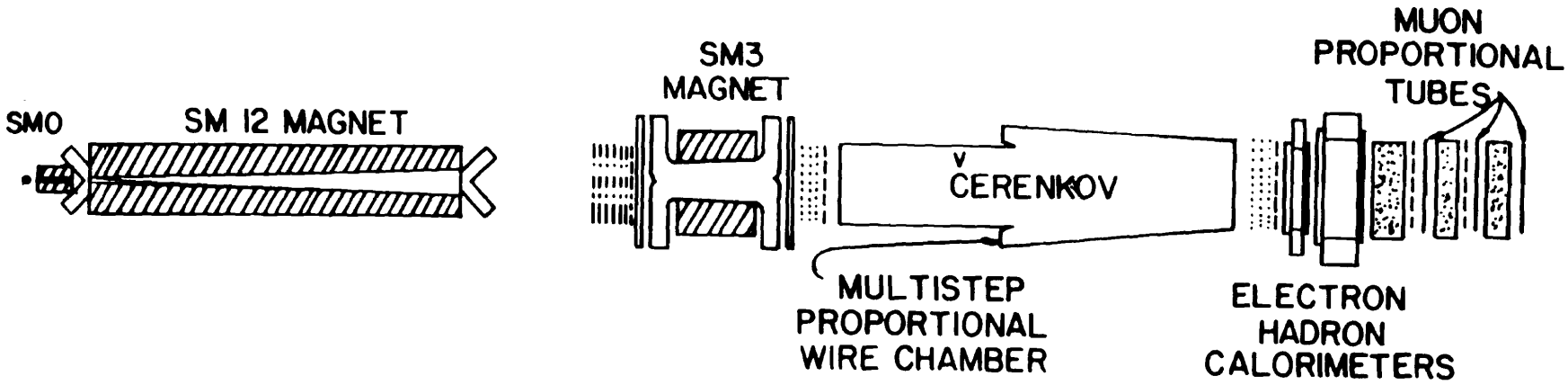


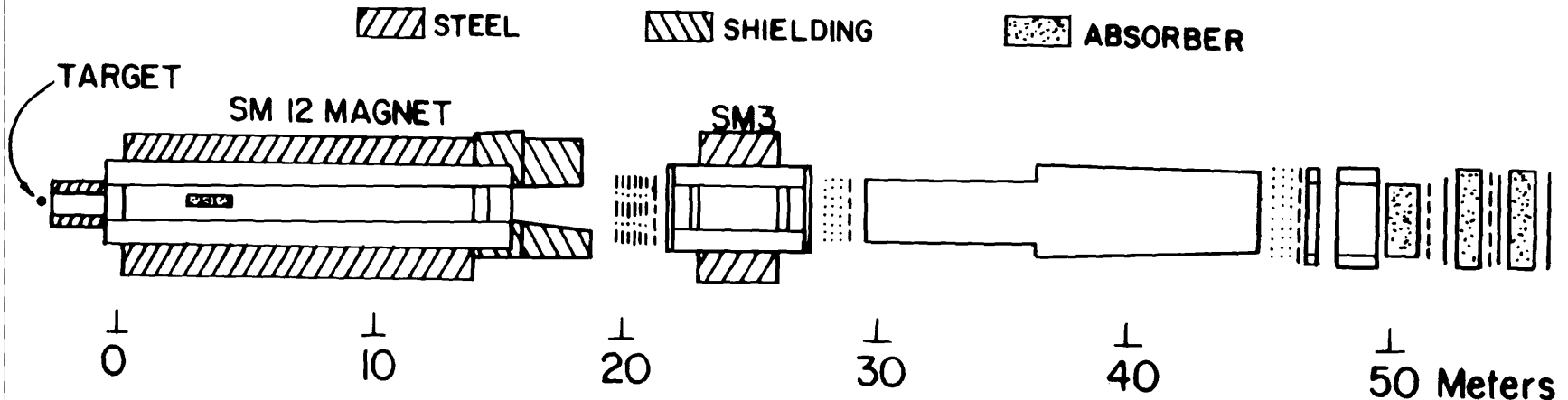
Figure 19. Fermilab experimental program. All major approved experiments not yet completed by the beginning of 1993 are shown here, listed by number, spokesperson, collaborating institutions and a short physics description. Not shown are experiments E-799 and E-832, for which a location has not as yet been determined.

SECTION VII. SUMMARIES OF APPROVED EXPERIMENTS

As in recent Workbooks, this Section is expanded considerably from earlier years. More information is given on the current status of each major experiment, including the status of the data analysis. In addition, we have included experiments that completed data taking in the past few years, but are still analyzing data. Some information on publications and theses is also given. Test beam activities are not included; they are, however, given experiment numbers and are listed in the Situation Report of Section VI and also in Section VIII.



PLAN VIEW E-605



ELEVATION SECTION E-605

DRIFT CHAMBER

PROPORTIONAL CHAMBER

COUNTER BANK

E-605 (McCarthy) Study of Leptons and Hadrons Near the Kinematic Limits

CERN (Switzerland), Columbia, Fermilab, KEK (Japan), Kyoto (Japan), Saclay (France), SUNY/Stony Brook, Washington

Status: *Data Analysis*

The goal of this experiment is to study lepton and hadron production (both singles and pairs) for particles produced with very high transverse momentum. Any massive hadron or lepton resonance can be studied with excellent resolution. In addition, the experiment will study many QCD predictions deriving from the internal quark structure of hadrons. Particle ratios, lepton yields and A-dependence of high P_T yields provide important probes into the detailed dynamics of quarks in nucleons.

The apparatus consists of a wide-aperture magnetic spectrometer in which the first active electronic detectors are protected from the copious low energy fluxes from the production target by a magnetic field of 8.9 GeV transverse kick. A momentum reanalysis in a large .9 GeV transverse kick spectrometer magnet provides excellent background rejection. Proportional wire chambers and drift chambers are used to trace particle trajectories. Calorimetry is performed using lead-scintillator and steel-scintillator arrays. The spectrometer includes a large aperture ring imaging Cerenkov counter capable of full hadron identification from 100 GeV/c to 250 GeV/c. We propose to take approximately 10^{12} protons/pulse at both 400 GeV/c and 800 GeV/c on both solid metal targets and also a LH_2/LD_2 target. This will enable us to unravel the quark structure of hadrons in a much larger range of fractional quark momentum and quark type than previous experiments.

For the FY 1985 run, an absorber and high-rate drift chamber was added at the exit of the first spectrometer magnet. This will allow a search for dimuon resonances above 8 GeV mass with the highest possible luminosity.

E-605 had substantial data runs at 400 GeV in 1982 and 1984 and at 800 GeV in 1984 and 1985. Data analysis continued until 1990, with the final publication of the remaining results expected to be in 1993. Meanwhile, the E-605 mass-focussing spectrometer has been modified, used for experiment E-772 in 1987, and E-789 in 1990 and 1991. It also forms the basis of pending proposal P-865 and recently approved E-866.

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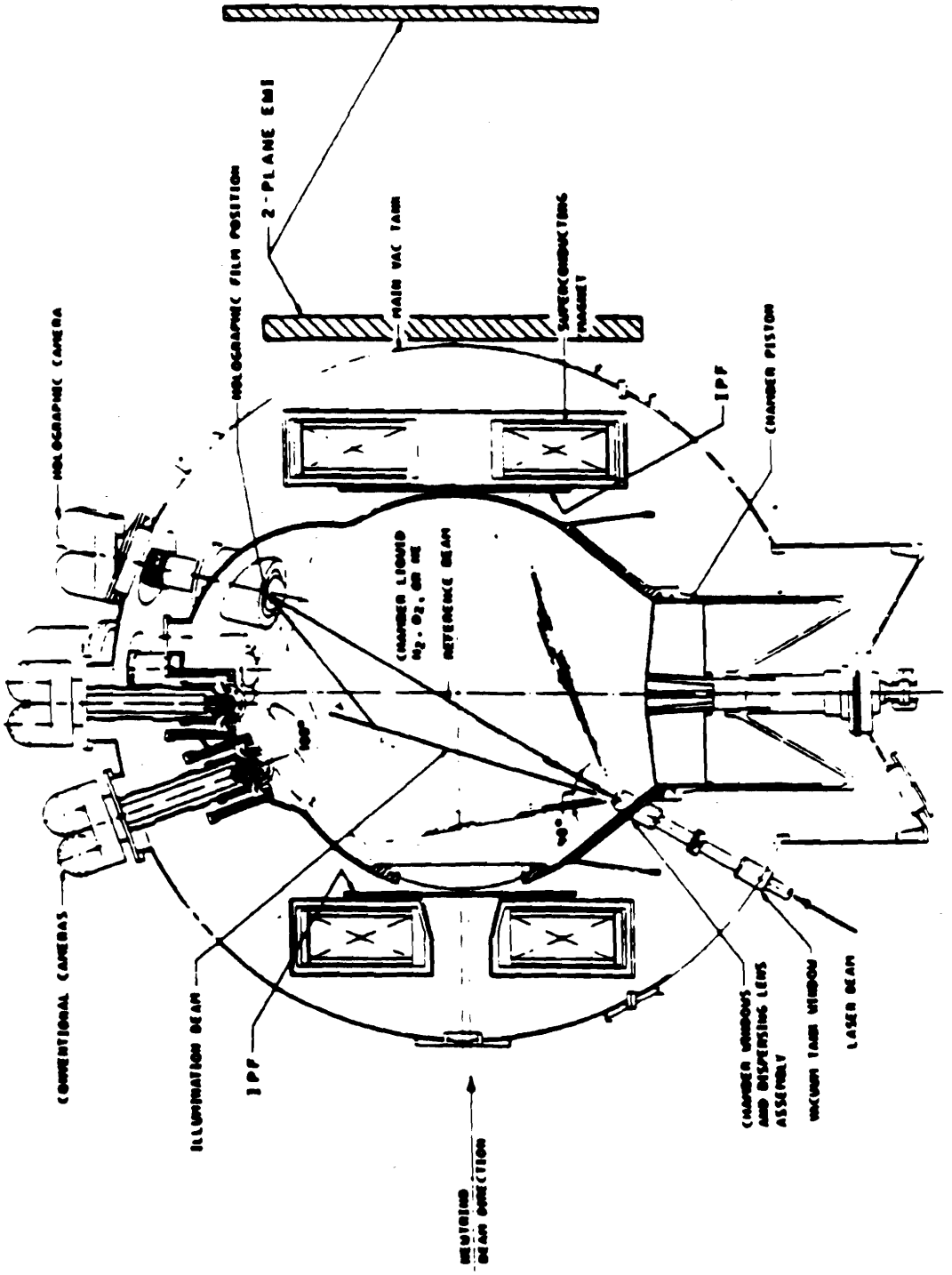
Yee-Bob Hsiung, Columbia Univ.
Dave Jaffe, SUNY Stony Brook
Bob Plaag, Univ. of Washington
Takuo Yoshida, Kyoto Univ.
Richard Gray, Univ. of Washington
Gerardo Moreno, CINVESTAV, Mexico
Bruce Straub, Univ. of Washington

E-632

FERMILAB 15' BUBBLE CHAMBER



E-632 (Morrison / Peters) An Exposure of the 15' Bubble Chamber with a Neon-Hydrogen Mixture to a Wideband Neutrino Beam from the Tevatron

Birmingham (Great Britain), UC/Berkeley, CERN (Switzerland), Fermilab, Hawaii, IHEP/Serpukhov (Russia), IIT, Imperial College (Great Britain), ITEP (Russia), Jammu (India), Libre (Belgium), MPI (Germany), Moscow State (Russia), Oxford (Great Britain), Panjab (India), Rutgers, Saclay (France), Stevens, Tufts

Status: *Data Analysis*

The experiment E-632 is to study interactions of a quad-triplet neutrino beam of the Tevatron in the 15-foot bubble chamber filled with a neon-hydrogen mixture. The main aim of the experiment is exploratory - to search for new particles or new effects in a new energy range. A second major goal is to study like-sign dileptons in the $\mu\mu$ mode since previous results at lower energies give the only major experimental deviation from the Standard Model. A third major aim is the study of neutral current interactions by using the Internal Picket Fence to identify such events. Many other physics topics, such as coherent production, will be simultaneously studied. In addition to the three conventional cameras of 500 micron resolution, high resolution for studying short-lived particles has been achieved using a holographic system giving 100 micron resolution in part of the chamber. The bubble chamber has been equipped with four new planes of counters. Two of them, called the Internal Picket Fence (IPF), are close to the chamber but covering the upstream and downstream directions - these have allowed the timing of events by assigning hits to the ends of tracks hitting the chamber wall. The other two planes of counters with absorber in between them and the chamber serve as the External Muon Identifier (EMI). The dimuon events have been selected using the four planes of counters.

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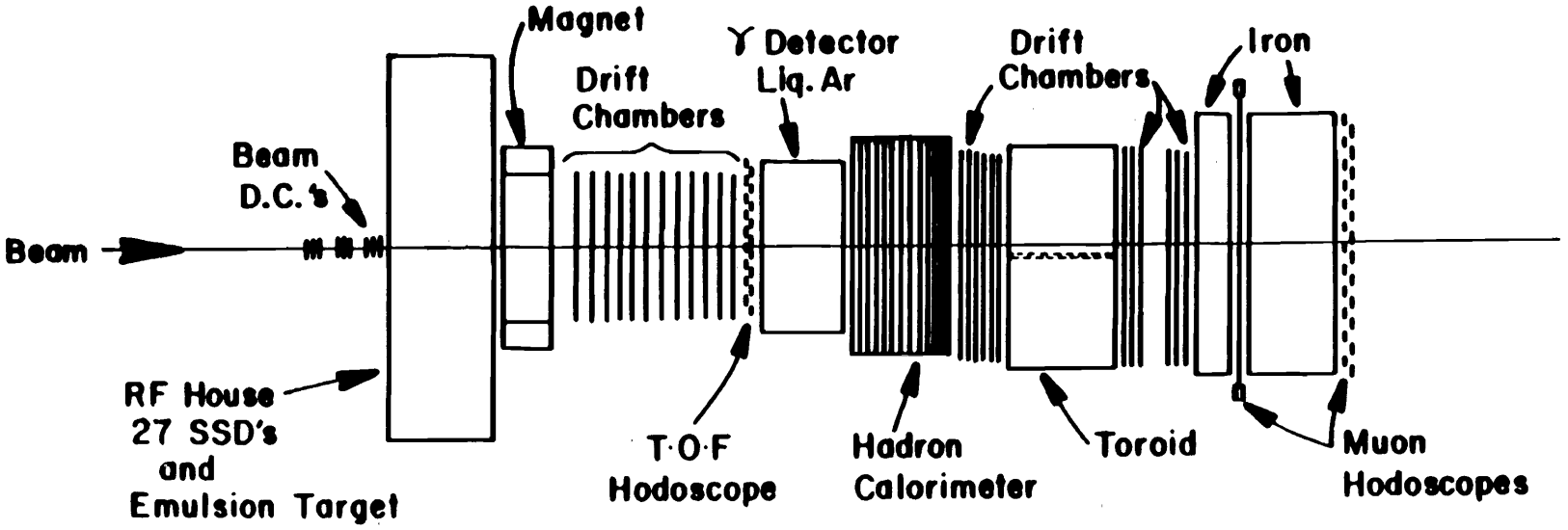
Magnet
Drift Chambers
Υ Detector Liq. Ar
Drift Chambers
Iron
Beam D.C.'s
Beam
RF House 27 SSD's and Emulsion Target
T·O·F Hodoscope
Hadron Calorimeter
Toroid
Muon Hodoscopes

E-653 (Reay) Measuring Charm and Beauty Decays Via Hadronic Production in a Hybrid Emulsion Spectrometer

Aichi (Japan), UC/Davis, Carnegie-Mellon, Chonnam National (Korea), Fermilab, Gifu (Japan), Gyeongsang National (Korea), Joenbug (Korea), Kinki (Japan), Kobe (Japan), Korea (Korea), Nagoya (Japan), Nagoya Inst. of Tech. (Japan), Ohio State, Okayama (Japan), Oklahoma, Osaka City (Japan), Osaka Sci. Ed. Center. (Japan), Toho (Japan), Utsunomiya (Japan), Yokohama National (Japan), Won Kwang (Korea)

Status: *Data Analysis*

Scientists from Japan, Korea, and the United States are now analyzing data from E-653, a study of hadronically-produced charm and beauty with a hybrid emulsion spectrometer[1].

The experiment used an active target of nuclear emulsion in which the primary interaction and short-lived decays can be observed. A spectrometer featuring an 18-plane silicon microstrip vertex detector provides the information for selecting events to be scanned in the emulsion. This spectrometer can also obtain clean samples of charm decays without use of emulsion information. Since the experiment was triggered by a muon, an enhanced sample of semimuonic charm decays was obtained. The trigger muon is also important in identifying the twelve beauty pairs which have so far been found.

Emulsion has a spatial resolution an order of magnitude better than other particle detectors, and can in this experiment measure proper decay times as short as 0.05 picosec, and decaying particle directions typically to 1 milliradian. It is ideally suited for untangling sequential beauty $\rightarrow$ charm decay events. The silicon vertex detector locates vertices with an accuracy of 10 (200) microns transverse to (along) the beam. Additional apparatus includes a dipole magnet, vector drift chambers with 80 micron rms position resolution and 600 micron two-track resolution, a second magnetic spectrometer for muon analysis, and a liquid argon calorimeter with 1 mm resolution and 8 mm two-shower separation.

E-653 first studied hadroproduction of heavy quarks with an 800 GeV proton run in 1985, and again in a much more sensitive run with 600 GeV π^- in 1987. Published results from the proton run include a measurement[2] of the fraction of D^0 semimuonic decays which proceed via $K\mu\nu$, and measurements[3,4] of the production properties of inclusive charm and charm pairs in 800 GeV proton-emulsion collisions.

The pion run has yielded both charm and beauty. The charm results from this run which have so far been published include a measurement[5] of the form factor ratios in $D^+ \rightarrow K^{*0}\mu\nu$, with errors half as large as earlier work, a measurement of the branching ratio for this decay mode[6] relative to both $D^+ \rightarrow K^-\pi^+\pi^+$ and to $D^0 \rightarrow K^-\mu^+\nu$, and a study[7] of the production properties of charm produced by 800 GeV π^-. Currently under collaboration review and soon to be submitted for publication are the first measurement[8] of form factor ratios for

$D_s \rightarrow \phi\mu\nu$ and the first observation of $D_s \rightarrow (\eta+\eta')\mu\nu$[8], and a sensitive upper limit[9] on 4- and 5-prong semimuonic decays. Work is now in progress on Cabibbo-forbidden semimuonic decays, and on a remeasurement of the $D^0 \rightarrow K\mu\nu$ fraction with substantially reduced statistical and systematic errors. In Japan, the emulsion physicists have so far found one good candidate for $D_s \rightarrow \tau\nu$ and hope for an eventual sample of ten such decays.

A scan of the emulsion for events with muon transverse momentum $p_{T\mu} >$ 1.5 GeV/c has yielded nine beauty pair events, from which separate lifetimes for charged and neutral beauty have been measured[10], and from which both inclusive production properties and pair correlation information have been obtained[11]. A second emulsion scan with a reduced $p_{T\mu}$ requirement has so far yielded three more beauty pair candidates. The estimated yield from the full data sample is fifteen to twenty pairs. The tagged charm from the beauty scan, and from semileptonic decays, will yield more than 1000 charm pairs for production studies.

The E-653 analysis schedule calls for most U.S. analysis work to be complete early in 1993. The emulsion analysis in Japan will probably continue for at least another year, with some involvement from the U.S. side.

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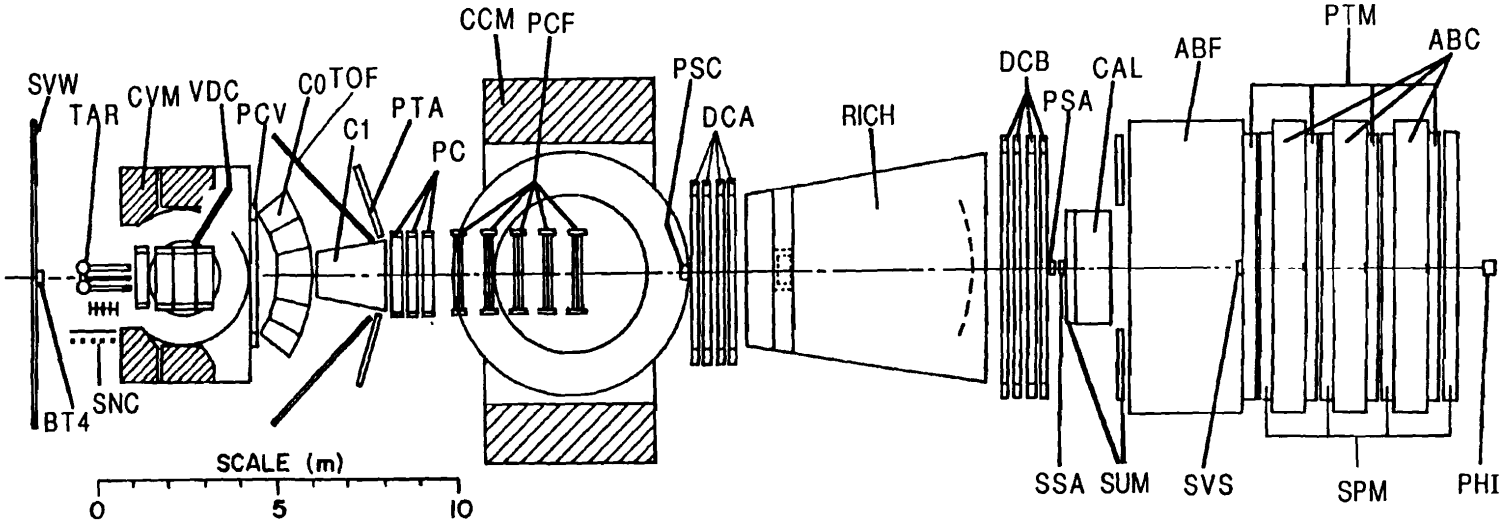
FERMILAB E665
MUON SPECTROMETER



SVW	7m x 3m Veto Counter Wall
BT4	Beam Tagging, Station 4
PBT	0.13m x 0.13m MWPC 6 Planes
SBT	0.13m x 0.18m Scintillation Counter Array
TAR	1m LH_2 + LD_2 + Solid Targets
SNC	Neutron Scintillators
CVM	CERN Vertex Magnet
VDC	Vertex Drift Chambers, 16 Planes
PCV	2.8m x 1m MWPC, 6 Planes
C0	144 Cell Threshold Cerenkov Counter
C1	58 Cell Threshold Cerenkov Counter
TOF	4.2m x 1.6m Scintillation TOF Arrays
PTA	2m x 2m Prop. Tube Arrays, 4 Planes
PC	2m x 2m MWPC, 12 Planes
CCM	Chicago Cyclotron Magnet
PCF	2m x 1m MWPC, 15 Planes
PSC	0.13m x 0.13m Small Angle MWPCs, 8 Planes
DCA	4m x 2m Drift Chambers, 8 Planes
RICH	Ring Imaging Cerenkov Counter
DCB	6m x 2m Drift Chambers, 8 Planes
PSA	0.13m x 0.13m Small Angle MWPCs, 8 Planes
SSA	0.13m x 0.13m Scintillation Counter Array
SUM	7m x 3m Scintillation Counter Array
CAL	3m x 3m EM Shower Calorimeter
ABF	7m x 3m x 3m Iron Absorber
SVS	0.23m x 0.3m Scintillation Counter Array
PTM	7m x 3m Prop. Tube Arrays, 8 Planes
SPM	7m x 3m Scintillation Counter Arrays
PHI	0.025m x 0.025m rf Phase Lock Scintillation Counters
ABC	0.9m Concrete Absorbers

E-665 (Schellman) Muon Scattering with Hadron Detection

ANL, UC/San Diego, Fermilab, Freiburg (Germany), Harvard, Illinois/Chicago, INP/Krakow (Poland), LLNL, Maryland, Max-Planck (Germany), MIT, Northwestern, Ohio, Pennsylvania, Washington, Wuppertal (Germany), Yale

Status: *Data Analysis*

The experiment studies the interactions of muons with average beam energies up to 500 GeV in various targets and with the capability of making detailed measurements of the hadrons that emerge from the collision vertex. To this end, the collaboration has combined two large magnets, the CERN Vertex Magnet (CVM) and the Chicago Cyclotron Magnet in a spectrometer that is as powerful as any known. We use this spectrometer in two basic, and for the most part complementary, ways to explore:

1) The properties of hadrons emerging from deep inelastic muon collisions in hydrogen and heavy nuclei. It is possible to study single quark fragmentation and jet physics in the same CM energy range as e^+e^- annihilation experiments which directly observe gluon radiation. In deep inelastic muon scattering, the fragmentation of the current and diquark jets (not seen in e^+e^-) can be measured relative to the precise knowledge of the exchanged virtual photon direction. By studying the A-dependence of these phenomena, we expect to learn new things about the propagation of quarks in nuclear matter and to use the nucleus as a length scale to study non-perturbative quantum chromodynamics.

2) Complementing the fragmentation studies are studies of the deep inelastic structure functions on the same nucleon and nuclear targets. Although the targets are relatively thin, the high incident muon energy makes this experiment particularly suited to the study of structure functions at small x_{Bj} (<0.02). This region is of great interest in the study of nucleon structure. Here, all experiments are limited by kinematics rather than rates, and the increased muon energy available at Fermilab automatically increases the available kinematic range.

The experiment took data for the first time during 1987-88 using deuterium, hydrogen and xenon targets. In 1990 the apparatus was supplemented with a tracking system of drift chambers inside the CVM to improve the pattern recognition capabilities and resolution of the spectrometer. With a new target system, allowing targets to be changed every 60 seconds, muon interactions in hydrogen, deuterium, carbon, calcium and lead were studied. During the 1991 fixed-target run, higher luminosity studies of hydrogen and deuterium focussed on the difference between the quark content of neutrons and protons and on the structure of events at the highest center of mass energies yet available in lepton-nucleon scattering experiments.

Efforts in 1992 concentrated on completion of analysis of the 1987-88 data and systematic studies of the 1990-91 data samples. Thirty percent of the 1990

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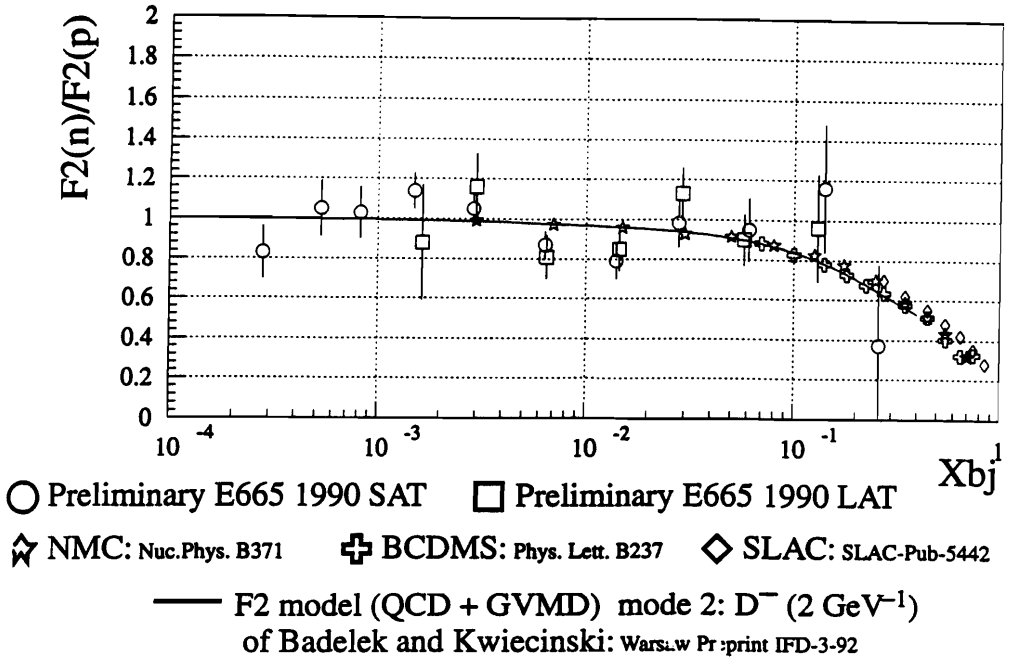


Figure 1. Preliminary neutron-to-proton structure function ratio from 30% of the 1990 data sample. The x region below 2×10^{-3} is unique to E-665. This plot represents only 3% of the total 1990/91 data sample.

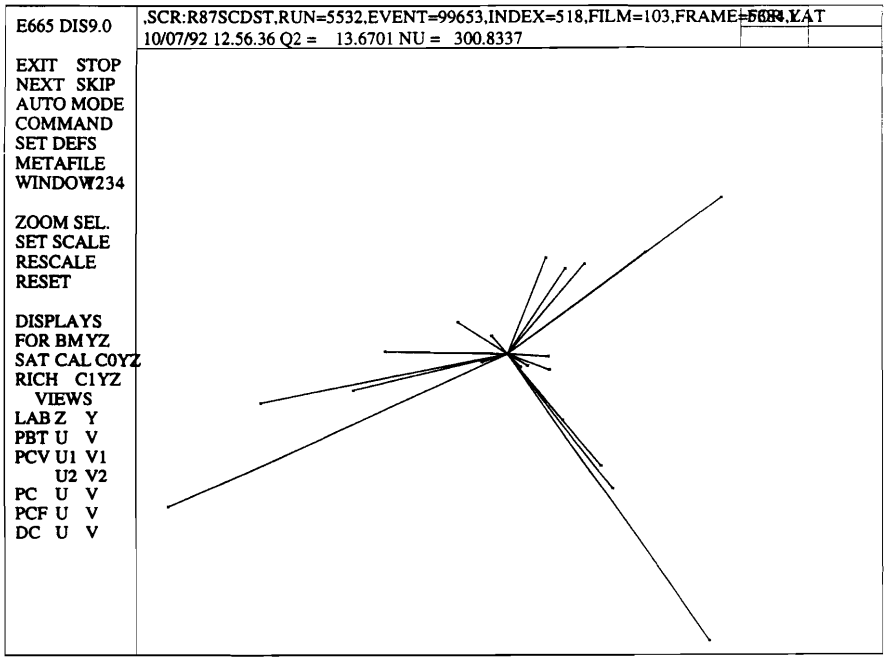
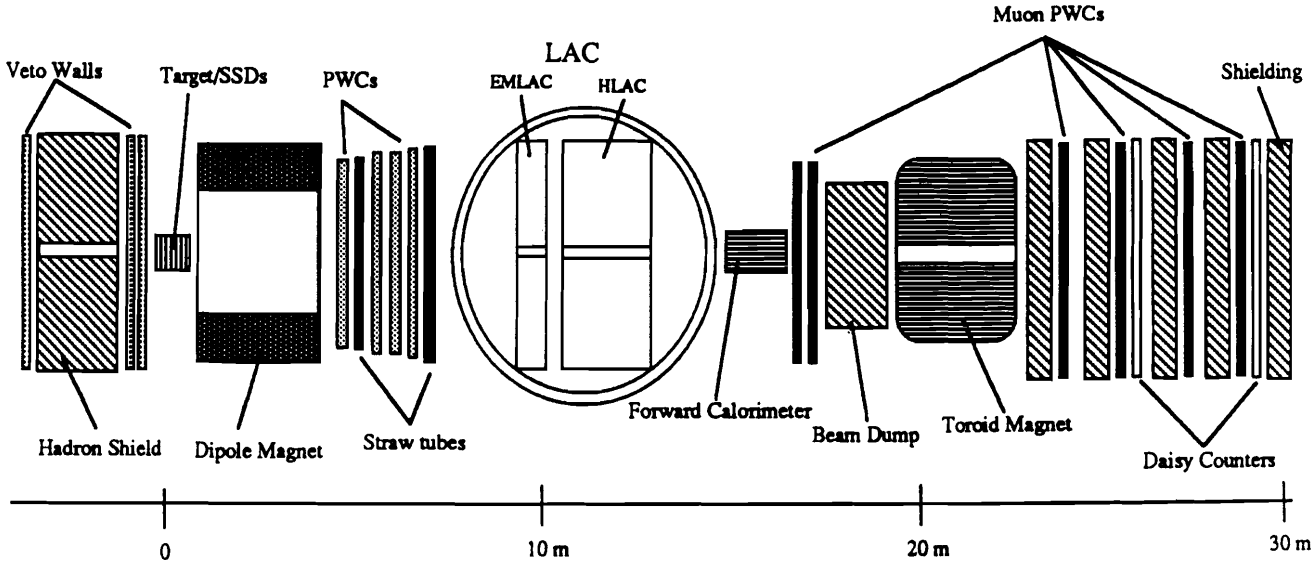


Figure 2. A multi-jet event from the 1987 data in the virtual photon-proton center-of-mass frame. Forward ($\theta < 90^{o}$) jet rates from 12,000 events taken in the 1987 run have been published [PRL 69, 1026 (1992)]. The 1990/91 sample will have of order 100,000 events with $E_{cm} > 20$ GeV. (The jet at $\theta \approx 180^{o}$ was reconstructed in the photographic streamer chamber.)

E-672



The Meson-West apparatus.

E-672 (Zieminski) Study of Hadronic Final States in Association with High Mass Dimuons

Fermilab, Illinois / Chicago, IHEP / Serpukhov (Russia), Indiana, Louisville, Michigan / Flint

Status: *Data Analysis*

The aim of the E-672 experiment is to study hadronic processes yielding vector mesons (ρ/ω, ϕ, J/ψ, ψ')and high mass dimuon pairs (the trigger) and associated particles. The experiment shares the MW beam line, magnetic spectrometer and calorimetry with the E-706 experiment. The dimuon detector is located downstream of the forward hadronic calorimeter and consists of a toroid magnet, six PWC's with three or four planes each, two scintillator hodoscopes used in the dimuon pretrigger and pretrigger and trigger processors.

E-672 is an open geometry dimuon experiment. The geometrical acceptance for dimuon pairs produced in hA collisions at 530 GeV/c is approximately 20% and has a maximum for Feynman x = 0.25. The physics goals, which all are related to experimental tests of Quantum Chromodynamics, include:

(a) Production of χ states by observing their radiative decays into $J/\psi\gamma$ with gammas either converting into e^+e^- pairs inside the target or observed in the LAC;

(b) Production of b-quarks observed via their decays to J/ψ (inclusive and exclusive modes: $J/\psi K$, $J/\psi K^*$ and $J/\psi K^0$);

(c) Production of b-quarks observed via double semileptonic BB decays into like-sign dimuons;

(d) General properties of the production of vector mesons (ρ/ω, ϕ, J/ψ, and ψ') and Drell-Yan pairs

- total and differential cross sections
- gluon structure function of the incident hadron
- production of associated charged and neutral particles
- dependence on the inelasticity on the collision
- the A-dependence of total and differential cross sections

(e) $J/\psi + n\pi$ spectroscopy (same for ϕ).

The first test/physics run of the experiment took place in 1987/88. Approximately 2000 J/ψ's were recorded and successfully reconstructed under various running conditions. Two papers were published: one on the A-dependence (PRL D141, 1 (1990)) and another on properties of J/ψ production in π^- Be and pBe collisions at 530 GeV/c (Fermilab-PUB-91-62E).

During the 1990 run we collected 5 million triggers with the 530 GeV/c π^- beam incident on Be and Cu targets. All triggers were processed through the off-line reconstruction. This gave us over 500,000 events with both muons originating from the target. The sample includes 15,000 reconstructed J/ψ events with J/ψ mass resolution better than 60 MeV/c^2 and over 500 ψ' events in the $\mu^+\mu^-$ and J/$\psi\pi^+\pi^-$ decay modes. It also contains approximately 15,000 ϕ events and 50,000 ρ/ω events. The quality of the data is far superior compared to the 1987/88 run due to extra tracking chambers, new SSD planes and reading out the LAC data without zero suppression.

We reconstructed over 100 $\chi \rightarrow$ J/ψ + e^+e^- decays and several hundred $\chi \rightarrow$ J/$\psi\gamma$ decays. A 10 MeV mass resolution enabled a clear separation of the χ (3510) and χ (3555) signals in the $\chi \rightarrow$ J/ψe^+e^- mode.

Several multivertex finding algorithms were developed. There are 73 events with J/ψ originating from well-separated vertices (3 sigma in transverse and longitudinal directions). Ten of the secondary vertices are outside the target region. We estimate that 26 $\pm$ 10 events are due to B $\rightarrow$ J/ψ X decay. We also observe five exclusive B $\rightarrow$ J/ψ K and B $\rightarrow$ J/ψ K* decays.

During the 1991 run we collected 10 million triggers with 530 GeV/c and 800 GeV/c protons incident on H, Be and Cu targets.

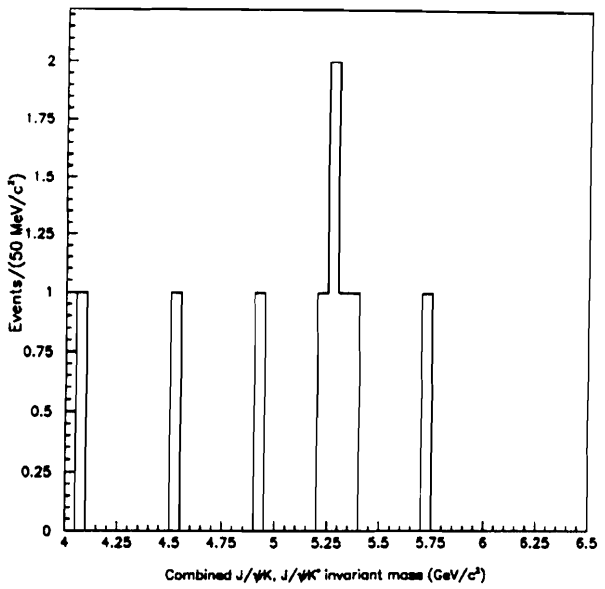


Figure 1. Combined $J/\psi K^{\pm}$, $J/\psi K^{0*}$ invariant mass.

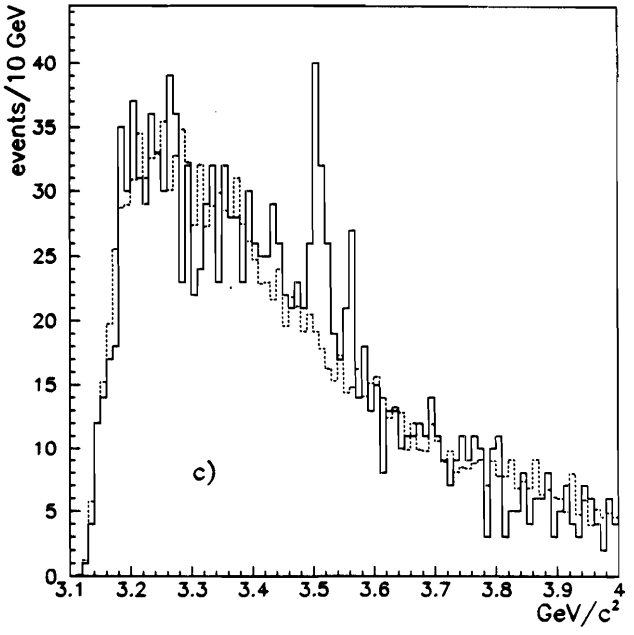
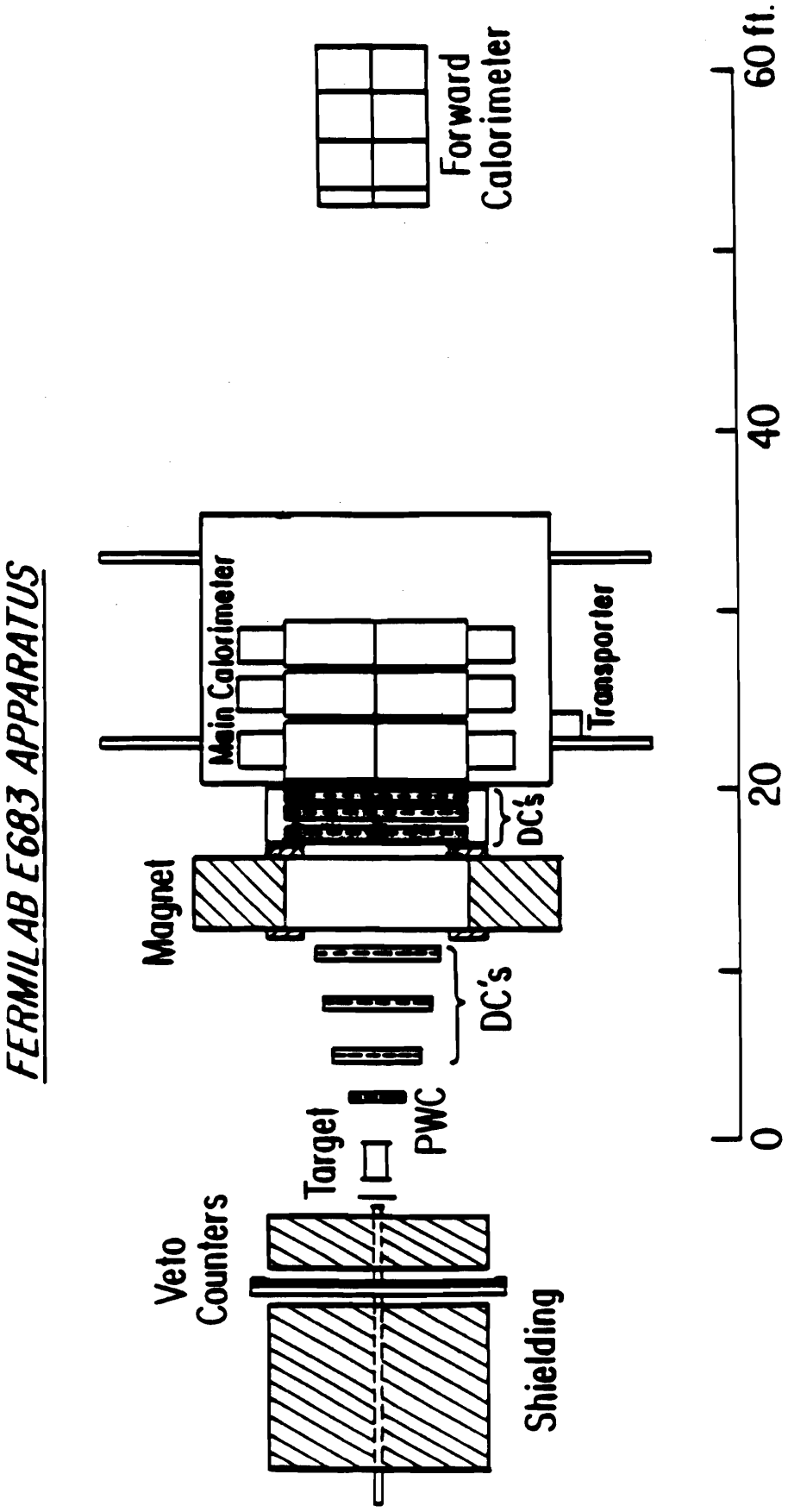


Figure 2. Mass distribution of e^+e^- J/ψ (solid histogram) with calculated background (dashed histogram) showing peaks corresponding to χ_{c1} and χ_{c2}.


FERMILAB E683 APPARATUS
Veto Counters
Target
PWC
DC's
Magnet
DC's
Main Calorimeter
Transporter
Forward Calorimeter
Shielding
0
20
40
60 ft.

E-683 (Corcoran) Photoproduction of High P_t Jets

Ball State, Fermilab, Houston, Iowa, Lehigh, Maryland, Michigan, Rice, Texas/Austin, Vanderbilt, Wisconsin

Status: *Data Analysis*

This experiment is studying the photoproduction of high p_t jets in the Wide Band Photon Beam of the Tevatron. The QCD processes of interest are QCD Compton scattering $\gamma q \rightarrow gq$ (which dominates at high x_t), and quark- gluon fusion $\gamma g \rightarrow q\bar{q}$. These processes are very distinctive, with the photon coupling as a point particle, giving all its energy to the two high-p_t jets, and producing no beam jet. The three-jet topology allows the separation of the direct-coupling processes from vector-meson-dominance-type processes, which produce the four-jet topology familiar in pp and πp interactions. Due to the lack of a beam jet and the large energy in the parton-parton frame, these jet events are expected to be very clean compared to jets produced in a π or p beam. We will measure the cross sections of both three-jet and four-jet events as functions of x_t, p_t, and y, and compare to QCD calculations. Full second-order calculations for these processes have been done by Jeff Owens at FSU.

Photoproduction of jets has a number of interesting features. The QCD Compton process is especially interesting and unique, since the gluon jet appears at the lowest order, well separated from the quark jet. Also, the angular distribution of the Compton process allows a separation of quark and gluon jets, allowing comparisons of their fragmentations. The quark-gluon fusion process probes the gluon structure function of the proton, and the four-jet events probe the high-x structure function of the photon.

The A-dependence of jet production from nuclei is of interest. The photon can produce partons deep inside a nucleus, allowing one to study the propagation of partons through nuclear matter. A photon beam is a clean probe of such processes. Also, in regions where the Compton diagram dominates, differences in propagation of quarks and gluons through nuclear matter might be observed.

Other processes which can be studied in this experiment include a higher-twist process, $\gamma q \rightarrow (\pi,p) + q$, and QED Compton scattering, $\gamma q \rightarrow \gamma q$. Confirmation of higher-twist processes is an important test of higher order effects in QCD. The A-dependence of the QED Compton process is an especially clean way to study the propagation of partons through nuclear matter.

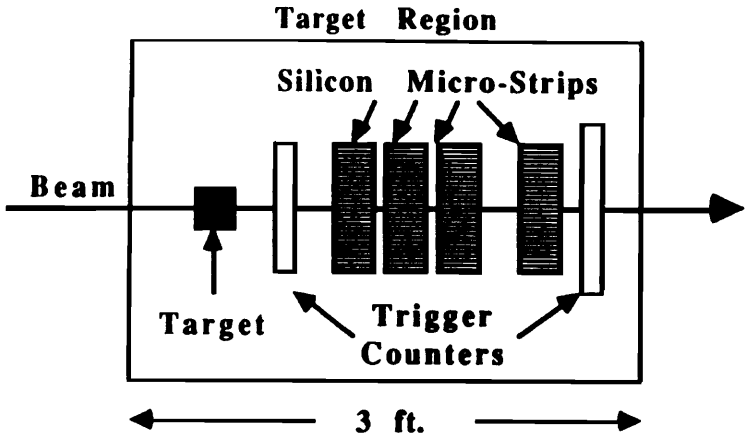
Photons in the momentum range 100 to 400 GeV/c are tagged with a momentum uncertainty of about 2%. A plan view of the apparatus is shown in the accompanying figure. It consists of a wide-angle magnetic spectrometer, the main calorimeter array, and a forward calorimeter. The spectrometer is comprised of an SCM-105 magnet with 20 planes of drift chambers and PWC's. The main calorimeter is segmented in area and depth and consists of 528 modules. The forward calorimeter measures the energy flow in the region from $\theta_{cm} = 0^o$ to

about 20°. Most of this equipment has already been used in E-609, where it performed quite well.

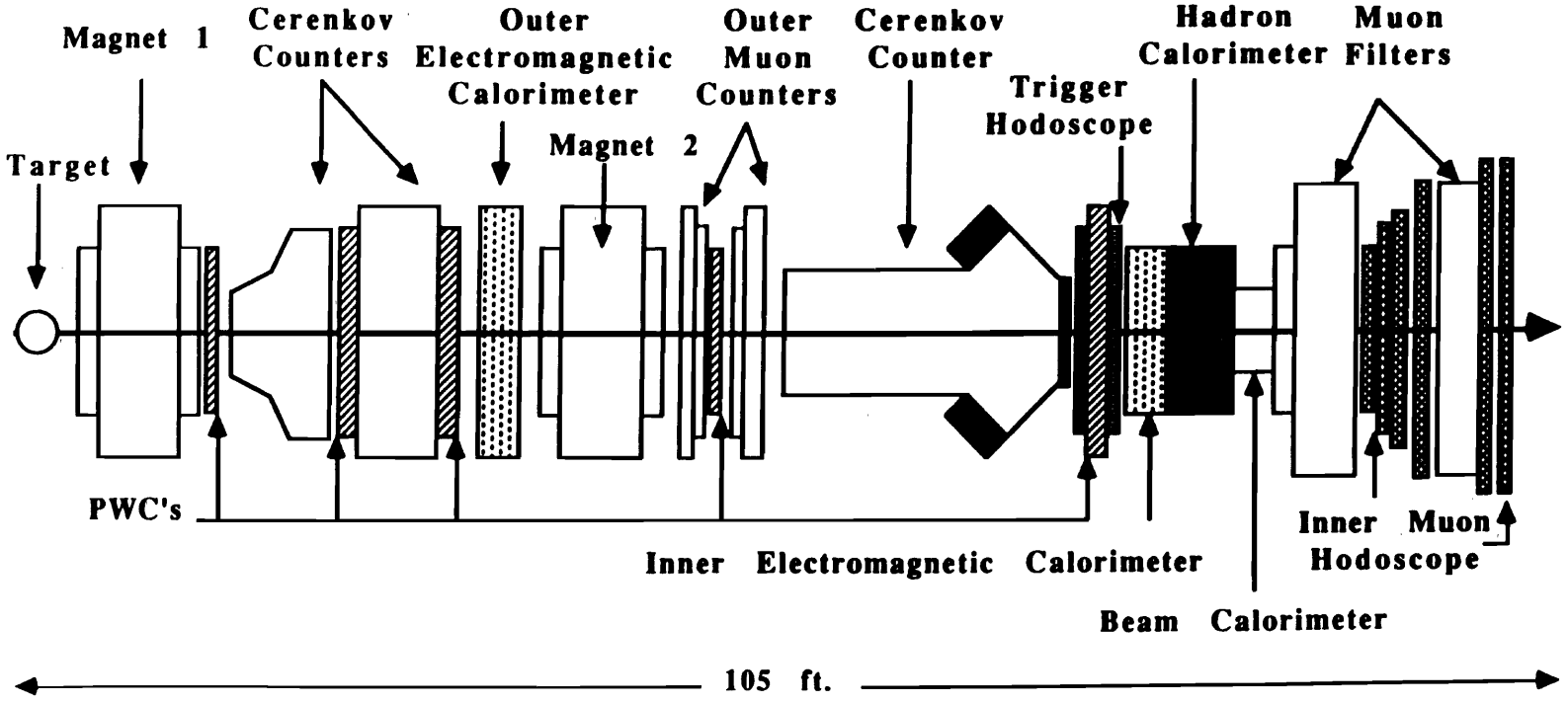
E-683 began data-taking in June of 1991, when the fixed-target program resumed. Data-taking was complete in January of 1992. A total of about 10 million triggers were recorded to tape, fairly equally divided between hydrogen, deuterium, and six different nuclear targets. Analysis is proceeding, both at Fermilab and at the various institutions.

One Rice student, Qiuan Zhu, has completed his thesis and taken a post doctoral position at UC Riverside. The title of Mr. Zhu's thesis is "A Study of Photon-Nucleus Collisions at High Transverse Energy." Bill Davis from Ball State University has received a Masters degree from his work on E-683.

Three E-683 students presented papers at the DPF meeting at Fermilab in November of 1992. The students and their papers were: Don Lincoln, Rice University, "Measurement of the Photon Structure Function;" Donna Naples, University of Maryland, "The A-dependence of K_t of Photoproduced Jets;" and Q. Zhu, Rice University, "A Study of Photon-Nucleus Collisions at High Transverse Energy." All three of these talks will appear in the proceedings. We currently have two Physical Review Letters and one NIM article in preparation.


Target Region
Silicon Micro-Strips
Beam
Target
Trigger Counters
3 ft.

E-687


Magnet 1
Cerenkov Counters
Outer Electromagnetic Calorimeter
Outer Muon Counters
Cerenkov Counter
Hadron Calorimeter
Muon Filters
Trigger Hodoscope
Target
Magnet 2
PWC's
Inner Electromagnetic Calorimeter
Inner Muon Hodoscope
Beam Calorimeter
105 ft.

E-687 (Butler) Photoproduction of Charm and B

INFN/Bologna (Italy), UC/Davis, Colorado, Fermilab, Illinois, INFN/Frascati (Italy), Korea (Korea), INFN/Milano (Italy), Milano (Italy), North Carolina, Northwestern, Notre Dame, Pavia (Italy), Puerto Rico/Mayaguez, South Carolina, Tennessee, Western Kentucky, Vanderbilt

Status: *Data Analysis*

E-687 is a photoproduction experiment in the Wide-Band Photon Beam. Interactions of photons whose energies are typically above 200 GeV are analyzed in a multiparticle spectrometer. The physics goal of the experiment is to reconstruct large samples of particles containing heavy quarks, charm and bottom, in order to study the dynamics of heavy quark photoproduction, to carry out detailed studies of the weak decays of charmed mesons and baryons, to study the decays of charmed mesons and baryons, to study the decays of particles containing B-quarks, and to study J/psi photoproduction. The spectrometer consists of two large analysis magnets, each having 30" × 50" aperture and transverse momentum kicks of up to 1 GeV/c; an 8400 element silicon microstrip detector with pitch varying from 25 microns to 100 microns; a system of proportional chambers with 13,500 wires of 2 and 3 mm spacing; three atmospheric gas Cerenkov counters each having about 100 cells; two electromagnetic calorimeters for photon reconstruction and electron identification; a gas hadron calorimeter for triggering, total energy measurement and neutral hadron reconstruction; and a muon identification system consisting of scintillation counters and proportional tubes.

In the first run of the experiment, in 1987/88, over 70 million events were collected. For the 1990 run, a beam tagging system was installed which measured the incident electron energy to better than 2%. The inner electromagnetic calorimeter was replaced with a scintillating fiber calorimeter. A new high speed data acquisition system, based on the Fermilab PANDA system, was installed. In the 1990/1991 run, more than 500 million events were collected with an improved trigger. The total data set contains more than 10^5 fully reconstructed examples of charm decay. These data have been entirely reconstructed and turned into Data Summary Tapes. Physics analysis is now underway. One paper from the 1991 run has been accepted for publication, two more have been submitted, and several more are being prepared for publication.

Below are three results on charmed baryons. Figure 1 shows the signal and lifetime of the Ξ_c^+, the charmed baryon with one charmed, one strange, and one up quark. This is based on the decay mode $\Xi^-\pi^+\pi^+$. It is now the best measurement of this quantity. Figure 2 shows a signal for the Ω_c, which is composed of a charm and two strange quarks (ssc), decaying into $\Omega^-\pi^+$. As a final example, the group has made a new measurement of the Λ_c lifetime. The signal is shown in Figure 3 with a variety of "significance of detachment" cuts. All these results have been

submitted for publication. Many other charmed baryon decays have been observed and are being studied, including decay modes containing Σ's.

Many hadronic decays of the D and D_s mesons have been observed and are being studied. The signal for D_s^+ decay and a comparison of the E-687 lifetime measurements to other experiments is shown in Figure 4.

Another area of study has been semileptonic decays. Here nearly all the data has been analyzed for the decays $D^0 \rightarrow K^-\mu^+\nu$ and $D^+ \rightarrow K^{*0}\mu^+\nu$. Figure 5 shows results for these modes for part of the 1990/91 data. The experiment has also succeeded in observing these semileptonic decays using electrons.

Another important set of studies involves the dynamics of charm photoproduction. Many inclusive cross sections (times branching fraction) can be measured. We are particularly interested in studying events in which both charmed particles have been fully reconstructed. The decay modes used in this study so far are:

$$\begin{aligned} D^0 &\rightarrow K^-\pi^+ \\ D^0 &\rightarrow K^-\pi^+\pi^-\pi^+ \\ D^+ &\rightarrow K^-\pi^+\pi^+ \end{aligned} \qquad (1)$$

Figure 6 shows a scatterplot of D meson candidates vs $\bar{D}$ meson candidates. The variable plotted is the 'normalized mass' defined as:

$$M_{norm} = \frac{M_{obs} - M_{PDG92}}{\sigma_{obs}} \qquad (2)$$

where M_{obs} is the observed mass of the candidate, σ_{obs} is its mass resolution, and M_{PDG92} is the mass value for the charm particle (D^0 or D^+) from the latest Particle Data Group listing. Use of this variable allows the three different modes to be plotted even though they have different mass values and more importantly, different mass resolutions. There is a clear accumulation at 0 (i.e. the PDG mass) in both variables, indicating D - $\bar{D}$ pair events. We are studying distributions of the following quantities for these pair events: the azimuthal angle correlation, the D - $\bar{D}$ invariant mass, and the rapidity difference.

These represent just a few of the many studies now underway. With this sample, we expect to gain a much better understanding of the dynamics of charm photoproduction, to make a definitive set of lifetime measurements, to improve the understanding of semileptonic decays, to investigate hadronic decays of charm baryons and mesons at a new level of sensitivity, and to look for rare and exotic processes, such as $D^0 \rightarrow \mu^+\mu^-$. The group also is studying more conventional topics such as vector meson photoproduction and the spectroscopy of higher mass vector bosons.

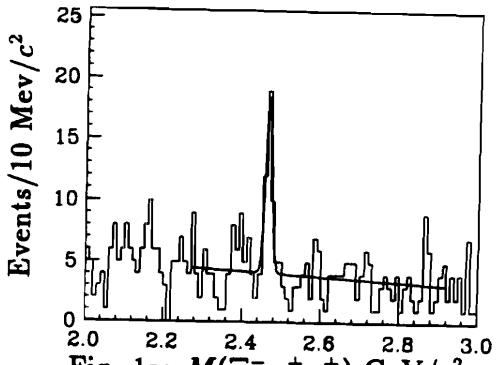


Fig. 1a: $M(\Xi^-\pi^+\pi^+)$ GeV/c^2

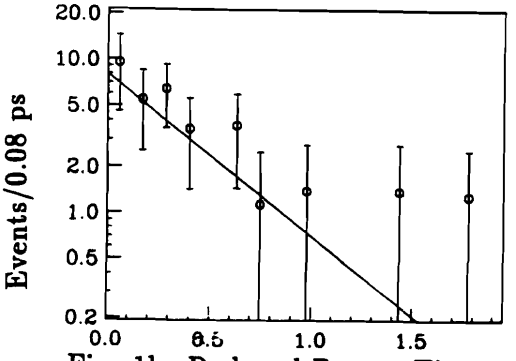


Fig. 1b: Reduced Proper Time

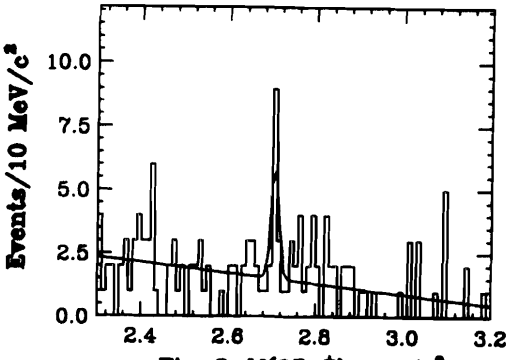


Fig. 2: $M(\Omega^-\pi^+)$ GeV/c^2

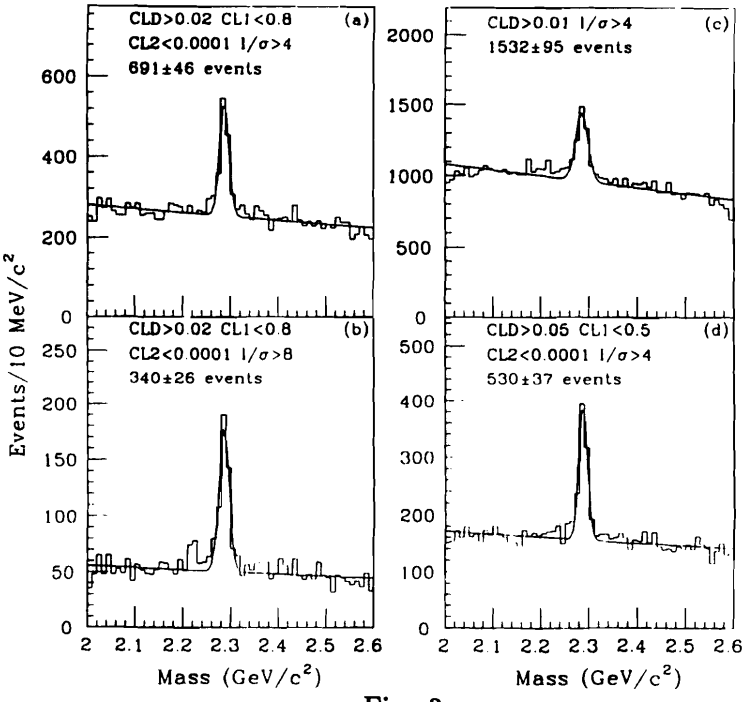


Fig. 3:

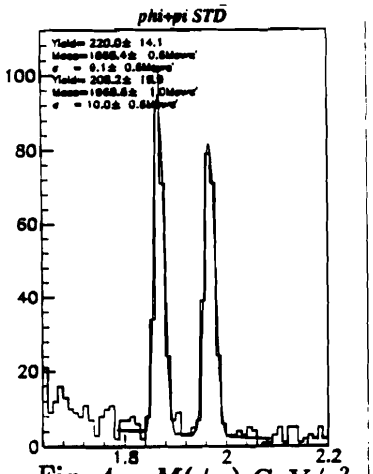


Fig. 4a: $M(\phi\pi)$ GeV/c^2

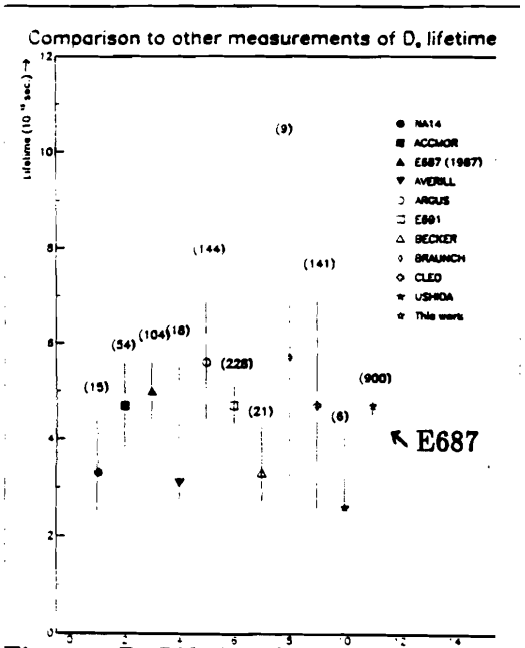
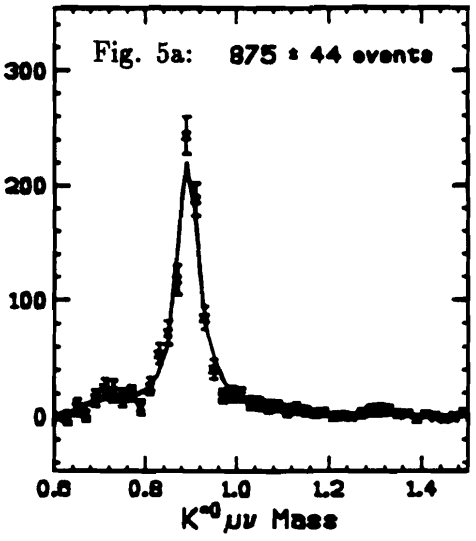
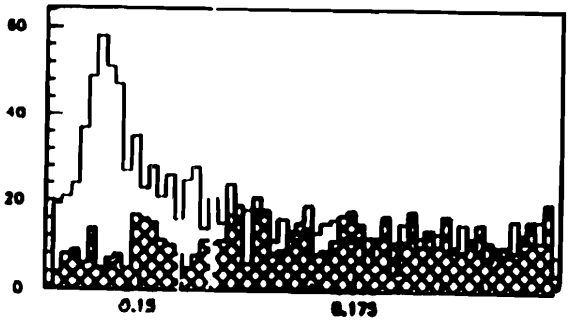


Fig. 4b: D_s Lifetime Measurements





$M[D^0(K^{\pm}\mu^{\mp}\nu)\pi^-] - M[D^0 \to K^{\pm}\mu^{\mp}\nu]$
shaded=wrong sign; unshaded=right sign

Fig. 5b

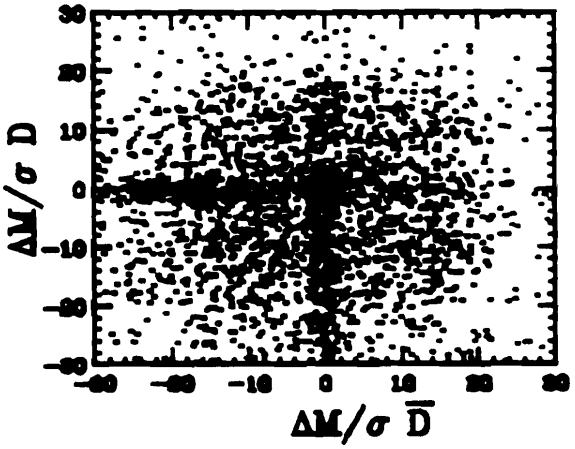
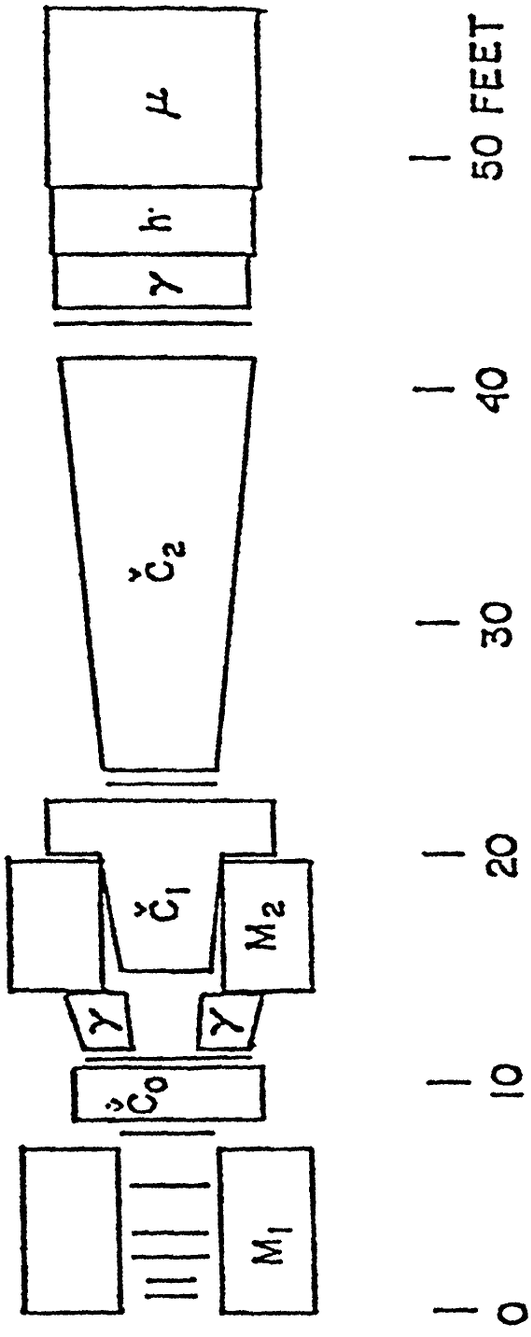


Fig. 6: D vs. $\bar{D}$ normalized mass


E-690
μ
h
γ
C2
C1
M2
γ
γ
C0
M1
0
10
20
30
40
50 FEET

E-690 (Knapp) Study of Charm and Bottom Production

Columbia, Fermilab, Guanajuato (Mexico), Massachusetts, Texas A&M

Status: *Data Analysis*

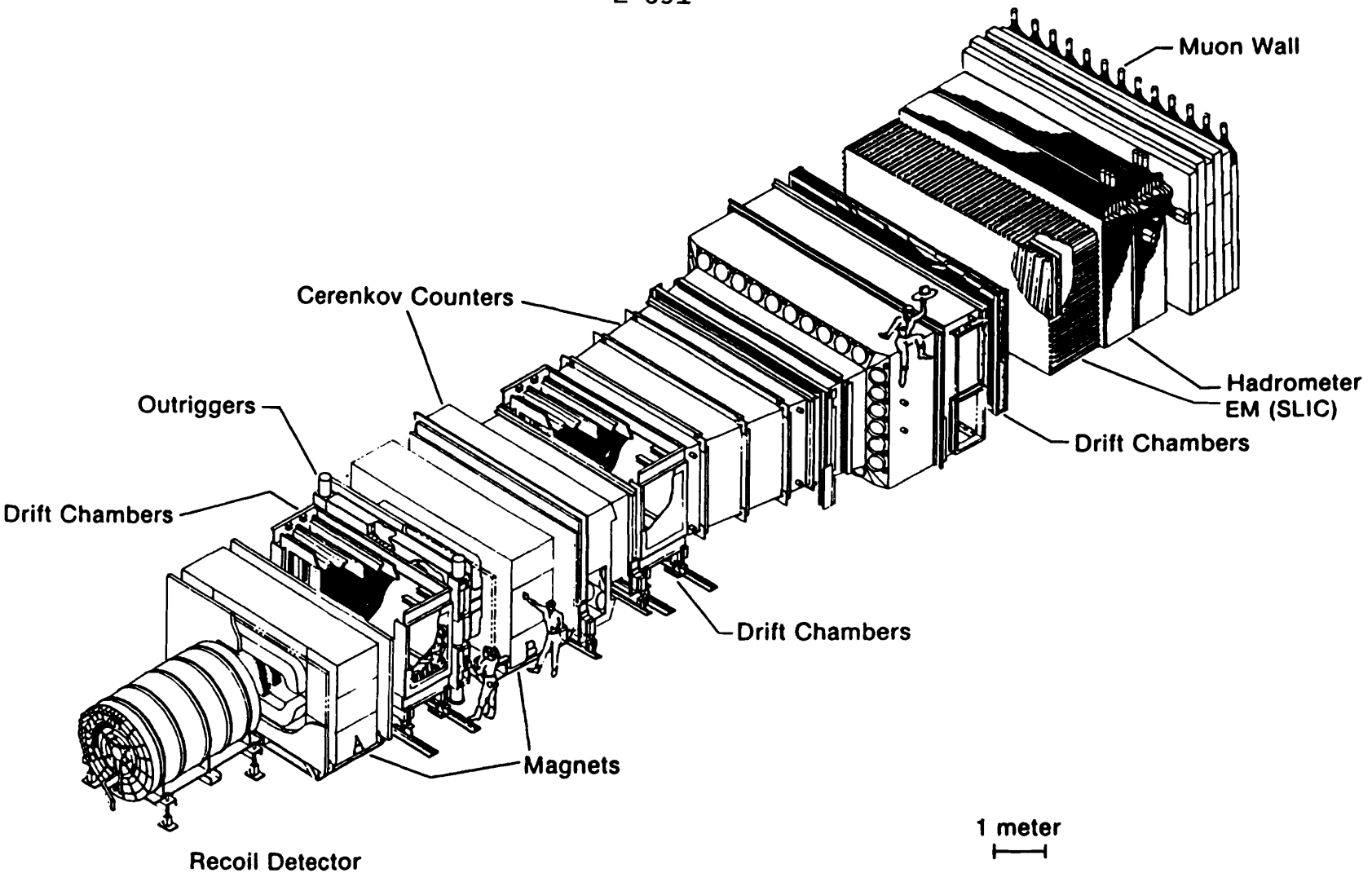
The primary purpose of this experiment is a detailed accurate study of the production and decay of charm and bottom particles. We will concentrate on fully reconstructed events, for which all final state particles have been accurately reconstructed. We observe a wide range of topologies with excellent resolution and acceptance and with few ambiguous particle identities. Assuming that $C\bar{C}$ production represents at least 10^{-3} of hadron interactions at Tevatron energies, we expect more than 10^4 $C\bar{C}$ per hour, fully reconstructed and isolated from backgrounds. For $B\bar{B}$ a production level of 10^{-6} should still permit several $B\bar{B}$ per hour, fully reconstructed and isolated.

The experiment measures charged particles with a two-magnet spectrometer using drift chambers with small cells. Particle identities are established with time-of-flight counters and segmented Cerenkov counters, some of whose cells will eventually be ring imaging. Photons and neutral hadrons will be observed with finely segmented calorimeters. This detector can measure complicated reactions, accurately and efficiently, at rates above 10^6 interactions per second. The readout electronics, including pipelined digital computation hardware, permits detailed numerical reconstruction of 10^5 events per second with little deadtime. A distributed hierarchy of trigger decisions can select any subset of raw data and calculations for transfer to an online computer and its tape drive.

The high rate capability of the detector and its associated event reconstruction hardware permit rare phenomena to be studied with high statistics, with trigger specificity and complexity normally reserved for tedious offline analysis. During each hour of data acquisition, the detector should be "live" for more than 10^9 interactions, and providing detailed numerical analysis of 10^8 events. Charm production reactions, if adequately measured, are highly constrained and readily isolated, but with multiparticle kinematic signatures well beyond the scope of traditional fast trigger logic.

We require a beam capable of providing a few 10^7 particles/sec of up to full accelerator energy. We measure the direction and momentum of the beam particle, and will eventually provide beam particle identification.

E-691


Muon Wall
Cerenkov Counters
Outriggers
Hadrometer
EM (SLIC)
Drift Chambers
Drift Chambers
Drift Chambers
Magnets
1 meter
Recoil Detector

E-691 (Witherell) Charm Production with the Tagged Photon Spectrometer

UC/Santa Barbara, Carleton (Canada), CBPF (Brazil), Colorado, Fermilab, NRC (Canada), Oklahoma, Sao Paulo (Brazil), Toronto (Canada)

Status: *Data Analysis*

While E-691 completed its data-taking in 1985, members of the collaboration continue to obtain interesting physics results from the 100 million event data set. Many of the measurements by E-691 dominate the world averages of relevant parameters. Over the past several years, the papers in refereed journals have covered topics relating to tests of the Standard Model, determination of the mechanisms of the electroweak decay of charm particles, QCD measurements, etc. Physics results are still coming out at a prolific rate.

The first publication from E-691 was of the A-dependence of J/ψ photoproduction. This data was taken in a special closed geometry period at the end of the run. Precision measurements of the lifetimes of charm mesons and the lowest mass charm baryon, from data taken with the standard open geometry spectrometer used during most of the run, followed soon after. These lifetime measurements, along with a wealth of branching ratios, serve as the basis of understanding the dynamics of charm quark decay, selecting among spectator, W exchange, annihilation and penguin diagrams in the hadronic decay sector. The measurements in the semileptonic domain include the first full Dalitz plot analysis in terms of all the kinematic variables available. This has become possible only with the size of the data set and good signal to background obtained after event selection.

Tests of the Standard Model have included searches for D^0-$\bar{D}^0$ mixing and flavor changing neutral currents in leptonic decays of D^0's.

The above open charm results derive from the observed decays in the experiment. The most copious signals have been used to study the production mechanism, dominated by photon-gluon fusion. From the data, interpreted with next to leading order calculations recently available, E-691 has been able to determine such fundamental parameters as the mass of the charm quark and has made the most direct determination of the distribution of gluons in nucleons.

All the above physics information has come from an upgraded version of the original Tagged Photon Spectometer (TPS). The most significant upgrade was the introduction of 9 silicon microstrip detectors downstream of a 5 cm beryllium target. These detectors, each with 50 micron-wide detector elements, supplied the capability of resolving the decay vertex from the primary production point of long-lived charm particles. This permitted events with charm particles to be selected from the much more copious, but less interesting background events. In addition, by using only those tracks which came from the decay vertex, the combinatoric background was enormously reduced.

Additional upgrades to the TPS included improvements in tracking (with six additional planes of drift chambers) and improvements in particle identification. The trigger for the experiment was a very general high-E_t trigger. This allowed accumulation of data for the wide variety of physics which has come out of the experiment. The Tevatron itself provided upgraded capability relative to earlier experiments. The higher energy allowed greater photon fluxes in the incident beam and the improved spill duty factor allowed collection of the formerly unprecedented amount of data. Finally, the experiment benefitted from the availability of the first ACP farm of microprocessors which significantly sped up the reconstruction of raw data to allow results with the full data set.

Publications

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Measurement of the D^+ and D^0 Lifetimes, J.C. Anjos, et al. Phys. Rev. Lett. 58, 311 (1987).

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Measurement of $D_s^\pm$ Decays and Cabibbo-Suppressed $D^\pm$ Decays, J.C. Anjos, et al. Phys. Rev. Lett. 60, 897 (1988).

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Measurement of the Λ_c^+ Lifetime, J.C. Anjos, et al. Phys. Rev. Lett. 60, 1379 (1988).

Measurement of the D^0, D^+, and D_s^+ Lifetimes, J.R. Raab, et al. Phys. Rev. D37, 2391 (1988).

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A Study of the Decays $D^+ \to K^0\pi^+$ and $D_s^+ \to K^0K^+$, J. C. Anjos et al., Phys. Rev. D41, 2705 (1990).

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Experimental Results on the Decays $D \to K4\pi$, J. C. Anjos et al., Phys. Rev. D42, 2414 (1990).

Theses

Johannes Raab, UCSB, Measurement of the Lifetimes of the D-Mesons (1987).

Thomas Browder, UCSB, A Study of D^0-$\bar{D}^0$ Mixing (1988).

Scott Menary, Toronto, Observation of Excited Charmed Mesons (1989).

Gregory Punkar, UCSB, Measurements of D_s^+ Decays and Cabibbo-Suppressed D^+ Decays (1989).

Mark Gibney, Colorado, Photoproduction of Charmed Baryons (1989).

Additional theses based on E-691 data are being worked on by

Audrius Stundzia, Toronto
David Schmidt, UCSB
Dan Sperka, UCSB
Tony Shoup, Cincinnatti
Bill Ross, Yale
Jean Duboscq, UCSB
Jenny Huber, UCSB

Papers In Publication Process

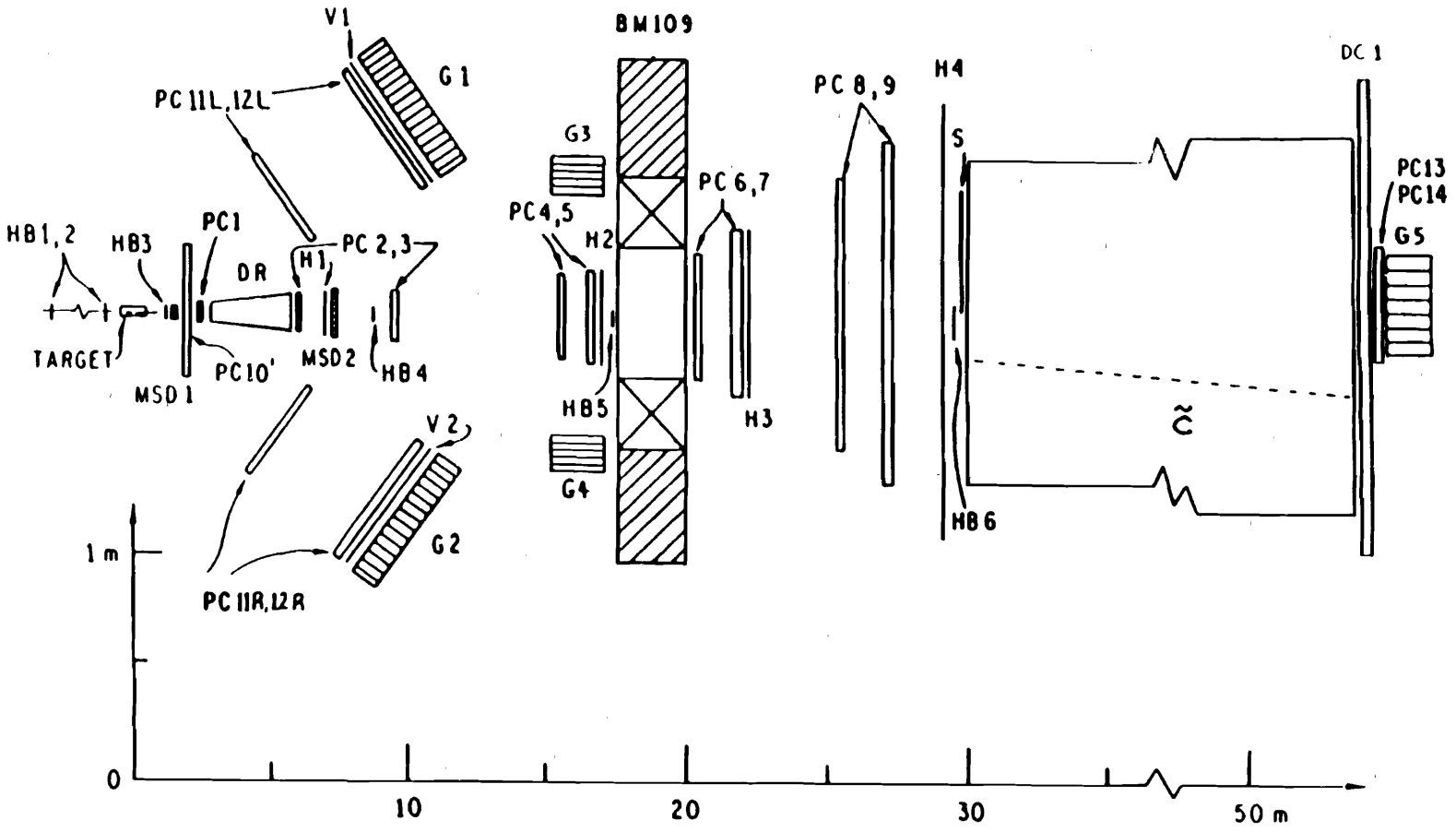
A Study of the Decay $D_s^+ \to \eta'\pi^+$ (Phys. Rev. Brief Report).

Some Cabibbo-Suppressed Decays of the D^0 Meson, Fermilab Pub-90/183-E (Phys. Rev. Brief Report).

Conference Papers In Preparation As Articles
(Expected Journal)

Measurement of the Decay Modes $D^0 \to \pi^+\pi^-$ and K^+K^- (Phys. Rev. Brief Report).

There are about eight additional analyses underway, which should produce at least five separate journal articles. These are in the areas of semileptonic decay, multibody D meson decays, resonant structure in $D \to K\pi\pi$ decay modes, photoproduction of charmonium, rare leptonic decay modes, and decays of charmed baryons.


V1
G1
PC 11L, 12L
BM109
G3
PC 6,7
PC 8,9
H4
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PC13
PC14
G5
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H2
HB1,2
HB3
PC1
PC 2,3
DR
H1
TARGET
MSD1
PC10'
MSD2
HB4
HB5
H3
G4
HB6
V2
G2
PC 11R, 12R
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E-704 (Yokosawa) Experiments with the Polarized Beam Facility

ANL, Fermilab, Hiroshima (Japan), IHEP/Serpukhov (Russia), Iowa, Kyoto (Japan), Kyoto Sangyo (Japan), Kyoto Education (Japan), LANL, LAPP/Annecy (France), Northwestern, Univ. of Occup. & Env. Health (Japan), Rice, Saclay (France), Trieste (Italy), Udine (Italy)

Status: *Data Analysis*

Experiment 581, Construction of a Polarized Beam Facility and Measurement of the Beam Polarization by Polarimeters, has obtained initial data on the properties of the new polarized beam.

Completion of a 200-GeV/c conventional-magnet beam line allowed observation of polarized protons and polarized antiprotons from decaying lambdas and antilambdas, respectively. A beam tagging system and two polarimeters, using the Primakoff effect and Coulomb-nuclear interference, measured the beam polarization during the 1987-1988 TeV-II period. Measured beam polarization was consistent with the designed value.

Experiment 704, the Integrated Proposal on First Round Experiments with the Polarized Beam Facility, constitutes a proposal to simultaneously perform substantial parts of previously proposed Experiments 674, 676, 677 and 678. The first 1200 hours of beam time for E-704 were allocated as follows:

1) First 300 hours for $\Delta\sigma_L^{Tot}(pp)$ including tuning.

2) 300 hours for $\Delta\sigma_L^{Tot}(\bar{p}p)$

The experimenters intend to explore the spin dependence of the interactions in a global way using a straightforward experiment which measures the difference in pp and $\bar{p}p$ total cross sections between the states with helicities of target and beam parallel and antiparallel. Experience shows that an accuracy of $\pm$ 100 microbarns can easily be achieved. A longitudinally-polarized proton target in a superconducting solenoid was used with the polarized beam during the 1990 fixed-target period. The data are being analyzed.

3) 600 hours for simultaneous measurements using a hydrogen target for A_N in large-$p_\perp$ π^0, large-x π's, lambda and sigma-zero production.

Studies of the inclusive production of neutral pions around $x_F \approx 0$ and large $p_\perp$ of neutral and charged pions at large x, and of $\Lambda^0(K^0)$ and Σ^0 at large x_F were carried out simultaneously. These measurements investigate the spin effects as a function of x_F and $p_\perp$. Interpretation of the polarization of Λ^0 and Σ^0 produced inclusively from an unpolarized initial state has given rise to extensive discussion about the origin of this polarization. It is expected that information on spin transfer from initial to final states in these reactions will enlighten the debate.

Elements of the existing polarization monitor were used in conjunction with new detectors in E-704. Two large calorimeters, each consisting of 500 lead-glass cells, detected photons from the π^0-decay. The magnetic spectrometer with proportional and drift chamber systems observed the $\pi^{\pm}$ and Λ^0 and Σ^0 decay products.

The technique for measuring single spin asymmetries in hadron production was considerably improved over the previous experiments since the polarized beam allowed the use of a liquid hydrogen target.

The following data are being analyzed:

$\Delta\sigma_L^{Tot}(pp)$ and $\Delta\sigma_L^{Tot}(\bar{p}p)$, $\bar{p}^{\uparrow}p \rightarrow \pi^{\pm}x$,

$p^{\uparrow}p \rightarrow (\Lambda,\Sigma^0)\,X$, $p^{\uparrow}p \rightarrow (\text{direct } \gamma)\,X$, and

detailed analyses of $p^{\uparrow}p \rightarrow \pi^0 X$ at $x_F = 0$.

The following data are published, or are to be published in Physics Letters:

$p^{\uparrow}p \rightarrow \pi^0 X$, $\bar{p}^{\uparrow}p \rightarrow \pi^0 X$ at large x_F,

$p^{\uparrow}p \rightarrow (\pi^0, \eta)X$ at $x_F = 0$,

A_{LL} measurement in $p^{\uparrow}p^{\uparrow} \rightarrow \pi^0 X$ at $x_F = 0$, and

$p^{\uparrow}p \rightarrow \pi^{\pm} X$ at $x_F = 0$ to 1.0.

Publications

Analyzing Power-Measurement in Inclusive π^0 Production at High x_F, B. E. Bonner et al., Phys. Rev. Lett. 61, 1918 (1988).

Polarized-Proton and -Antiproton Beams at Fermilab and Associated Experiments, A. Yokosawa, Int. Journal of Modern Physics A, Vol. 3, No. 12, 2753 (1988).

Analyzing Power-Measurements of Coulomb-Nuclear Interference with the Polarized-Proton and -Antiproton Beams at 185 GeV/c, N. Akchurin et al., Phys. Lett. B229, 299 (1989).

Measurement of the Analyzing Power in the Primakoff Process with a High-Energy Polarized Proton Beam, D. C. Carey et al., Phys. Rev. Lett. 64, 357 (1990).

The Design and Performance of the FNAL High-Energy Polarized-Beam Facility, D. P. Grosnick et al., Nucl. Instr. Meth. in Phys. Research, A290, 269 (1990).

First Results for the Two-Spin Parameter A_{LL} in π^0 Production by 200-GeV Polarized Protons and Antiprotons, D. L. Adams et al., Phys. Lett. B261, 197 (1991).

Comparison of Spin Asymmetries and Cross Sections in π^0 Production by 200-GeV Polarized Antiprotons and Protons, D. L. Adams et al., Phys. Lett. B261, 201 (1991).

Analyzing Power in Inclusive π^+ and π^- Production at High x_F with a 200 GeV Polarized Proton Beam, D. L. Adams et al., Phys. Lett. B264, 462 (1991).

High-x_t Single-Spin Asymmetry in π^0 and η production at $x_F = 0$ by 200 GeV Polarized Antiprotons and Protons, D. L. Adams et al., Phys. Lett. B276, 531 (1992).

Large x_F Spin Asymmetry in π Production by 200-GeV Polarized Protons, D. L. Adams et al., Zeit Physik C, to appear.

Papers Being Prepared on the E-704 Data

High x_F Single- and Double-Spin Asymmetry in Λ Production

Large x_F Spin Asymmetry in π^+ and π^- Production by 200-GeV Polarized Antiprotons

Differences in Total Cross Sections, $\Delta\sigma_L$

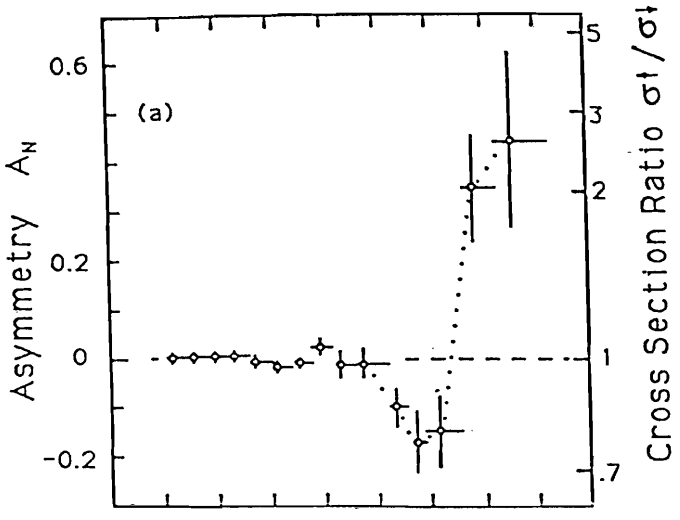
Complete Asymmetry Analysis on High x_T π^0 Production

Comments on data analysis and future plans:

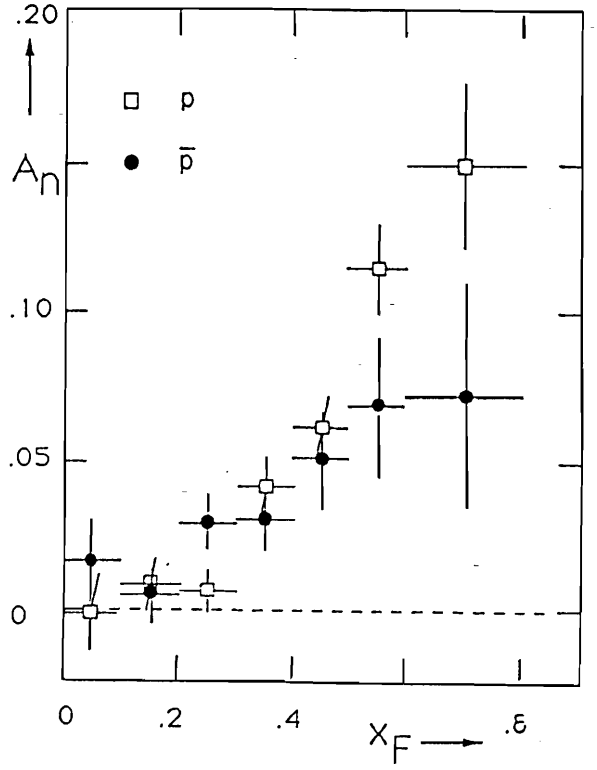
1. We plan to finish the analysis of single-spin asymmetry A-N in π^0 production at high p_T at 90° in the c.m.s. in p(pol.)p-interactions. Final results should include the impact on the asymmetry of charged particles associated with π^0 in both the same solid angle and in the opposite one. A scaling behavior of asymmetry in the hard interactions should be eventually checked at 200 GeV.

2. The π^0 and $\eta(550)$ invariant cross sections in pp- and $\bar{p}p$ interactions can be obtained from the data. The kinematic region will be as follows: $x_F \sim 0$; $1 < p_T < 5$ GeV/c. The interest is, do we see some dip in the cross section behavior. If we do, this dip (or break in the slope of cross section) should be connected with some structure in the asymmetry behavior at the same p_T values.

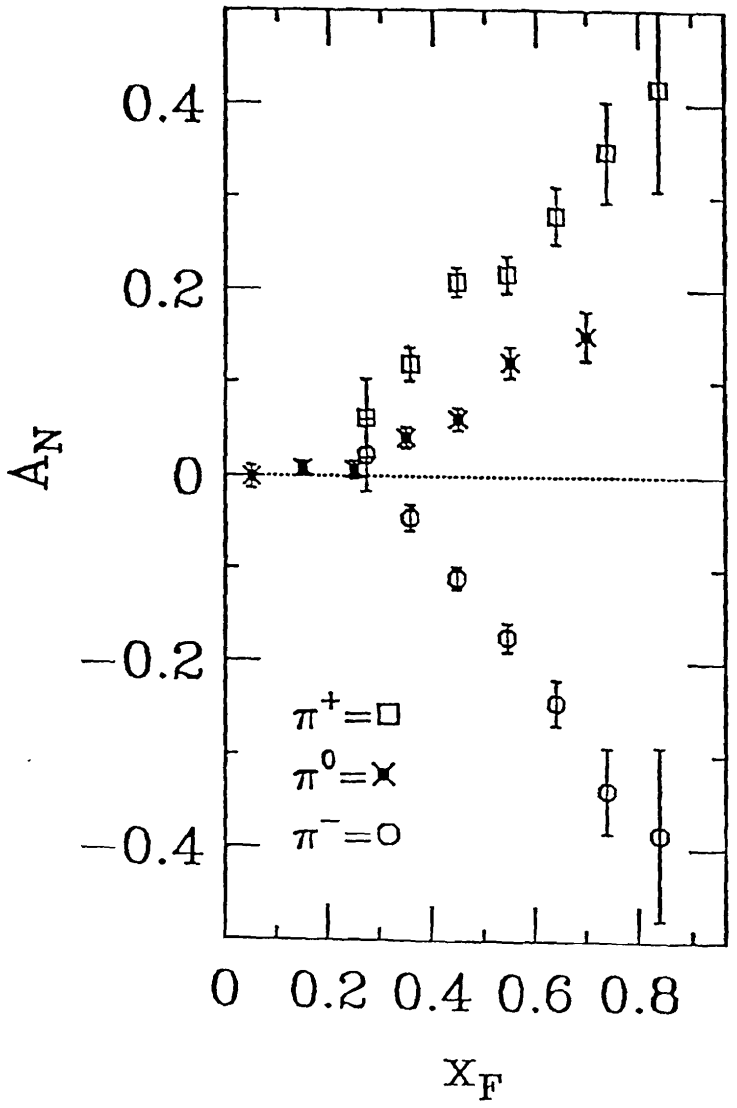
3. We will study from our data a single-spin asymmetry A_N in the η-meson production at large x_F in both pp and $\bar{p}p$ interactions. The kinematic region will be as follows: $0.3 < x_F < 0.8$ and $p_T \sim 1$ GeV/c. Earlier we saw a significant asymmetry in the $\pi^+\pi^-\pi^0$ production in the same kinematic region. Is it a case for η?



$p_\perp$ dependence of the asymmetry A_N in the reaction $p + p \rightarrow \pi^\circ + X$ at $xF \approx 0$.

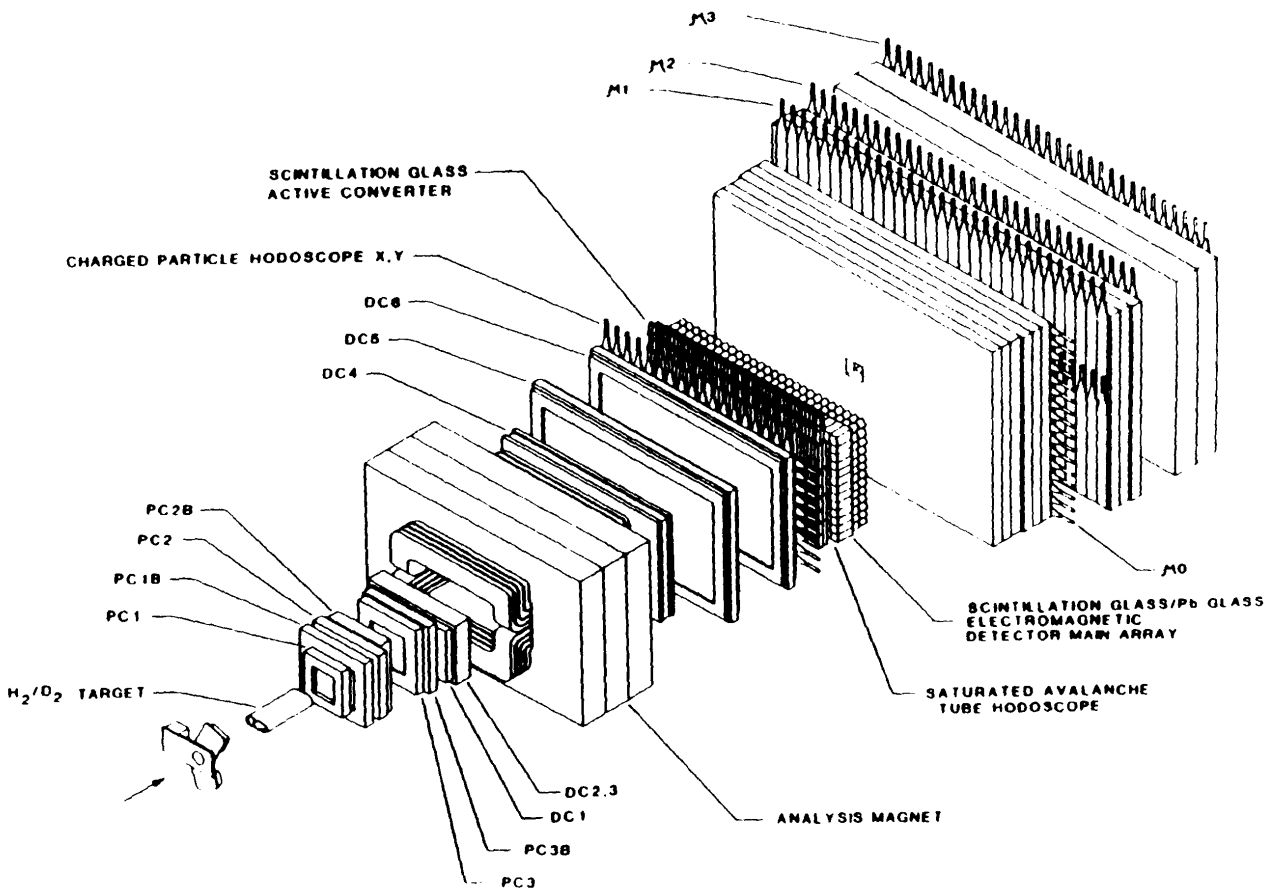


The asymmetry A_N in the reactions $P + P \rightarrow \pi^\circ + X$ and $\bar{P} + P \rightarrow \pi^\circ + X$ at 200 GeV in different regions of x_F, integrated over p_T from 0.5 to 2 GeV/c.



x_F dependence of the asymmetry A_N for π^+ (squares) and π^- (circles) production in the $p^{\uparrow}p$ reaction. For comparison, π° data (crosses) are also shown.

E-705
FERMILAB HIGH INTENSITY LABORATORY SPECTROMETER



E-705 (Cox) A Study of Charmonium and Direct Photon Production by 300 GeV/c Antiproton, Proton, and Pi^{+-} Beams

South Alabama, Arizona, Athens (Greece), Duke, Fermilab, INFN/Florence (Italy), McGill (Canada), Nanjing (PRC), Northwestern, Prairie View A&M, Shandong (PRC), SSCL, Virginia

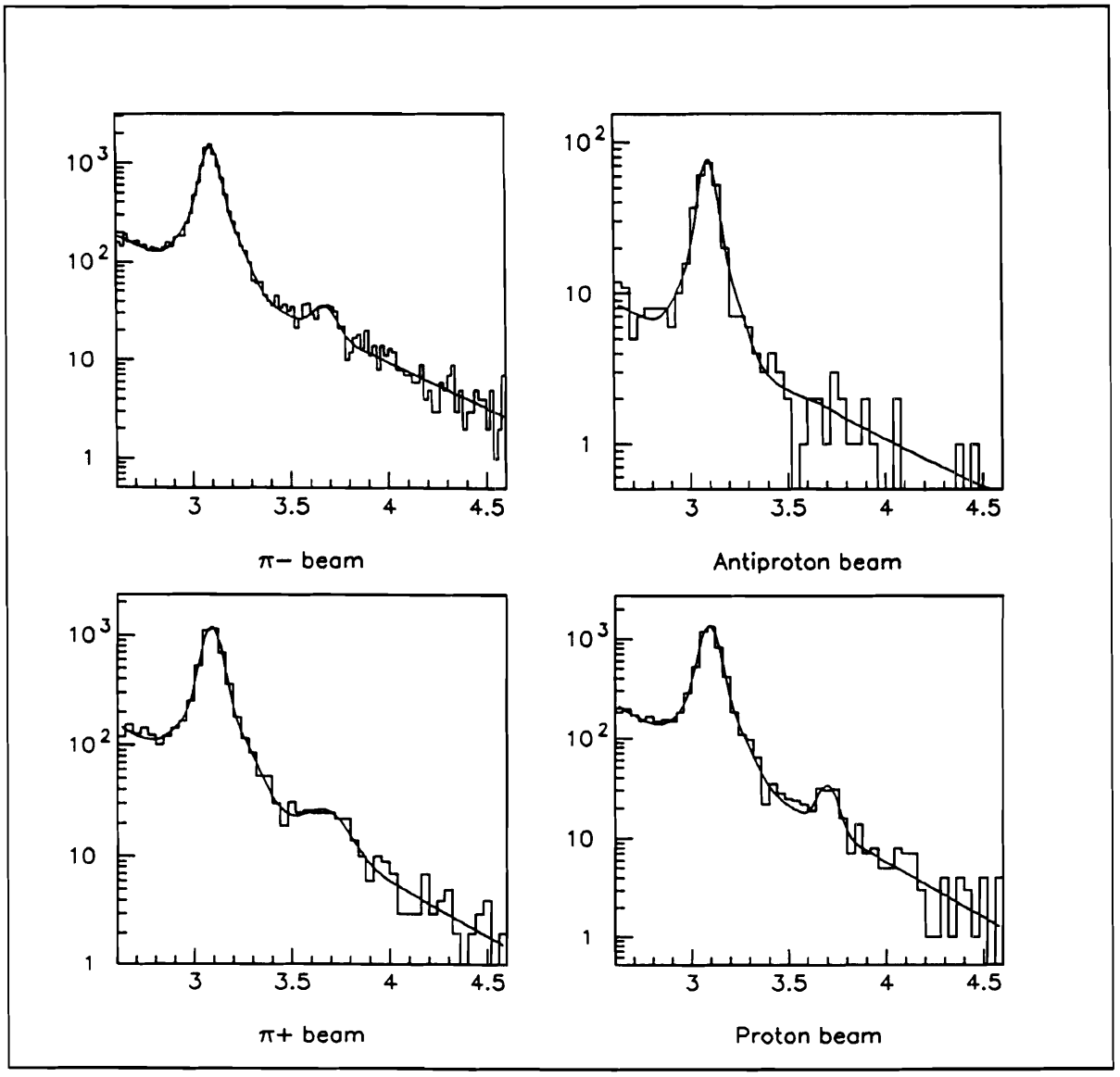
Status: *Data Analysis*

E-705 constructed and commissioned a large aperture spectrometer to study direct photon and charmonium production using 300 GeV/c π^{+-} and p^{+-} beams in the High Intensity Laboratory in the Proton West Area. The unique features of this spectrometer include a high resolution electromagnetic shower detector constructed from scintillation glass. The good electromagnetic energy resolution for photons should allow the separation of the closely spaced charmonium states which are detected through their $\chi \rightarrow \psi\gamma$; $\psi \rightarrow \mu^+\mu^-$ decay modes. Comparison of the production of direct photons and charmonium states using different beam types should allow the separation of $\gamma\gamma$ and $q\bar{q}$ components of the production process. The high resolution, high statistics measurements of the chi states will allow the determination of the decay angular distributions of the charmonium states yielding more information on the production processes.

In 1990, E-705 completed a massive amount of data analysis, processing between December 1, 1989 and October 1, 1990, over 6,000 data tapes with both dimuon and direct photon triggers. This work continued the 1989 activity in which the E-705 analysis code was tuned up by a complete analysis of approximately fifteen percent of the data. In addition, 1,500 calibration and test tapes were processed and studied to obtain the final constants for the experiment.

The final step of analysis of J/ψ data was accomplished in 1990 and total and differential cross sections for production of J/ψ's by 300 GeV/c protons, antiprotons, and π^{+-} have been obtained from a sample of greater than 30,000 J/ψ's. Studies of ψ' production and decay have also been accomplished with observations in the dimuon and J/ψ $\pi^+\pi^-$ decay modes. The J/ψ $\pi^+\pi^-$ mass spectrum is under examination in a search for evidences of exotic states. The final determination of the various charmonium state production cross sections is almost completed pending the final photon reconstruction code tuning for maximum photon resolution.

The direct photon analysis has proceeded in parallel; both γ/π^0 and absolute direct photon x_F and p_t differential cross sections have been determined for π^{+-} Li interactions out to p_t of 7 GeV/c. Structure functions for the π^{+-} have been determined with a pronounced prejudice toward a soft gluon distribution (Duke-Owens set II). The analysis of the proton and antiproton data is underway.


10^3
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π− beam
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3.5
4
4.5
Antiproton beam
10^3
10^2
10
1
3
3.5
4
4.5
π+ beam
10^3
10^2
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Proton beam

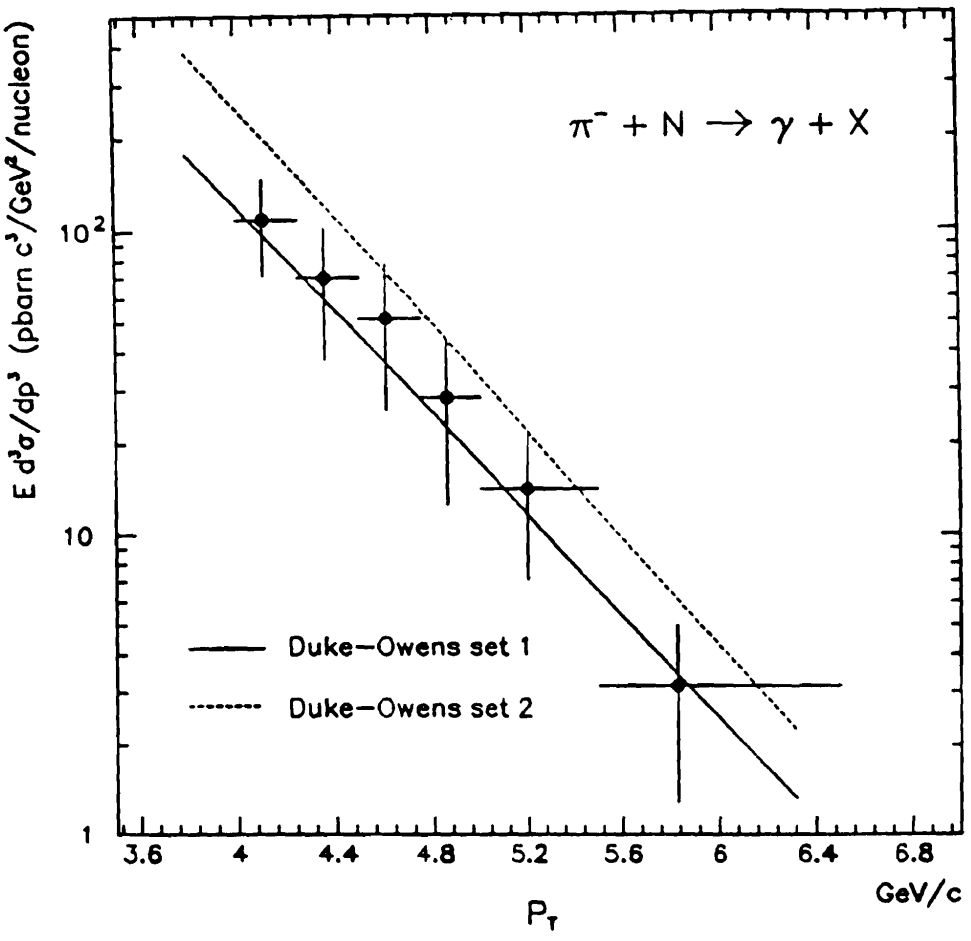
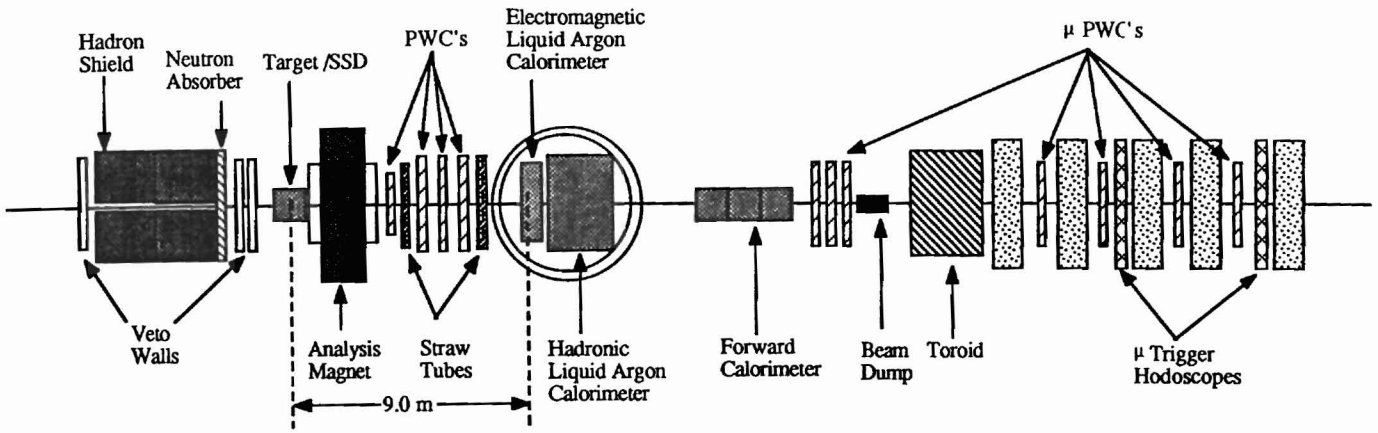
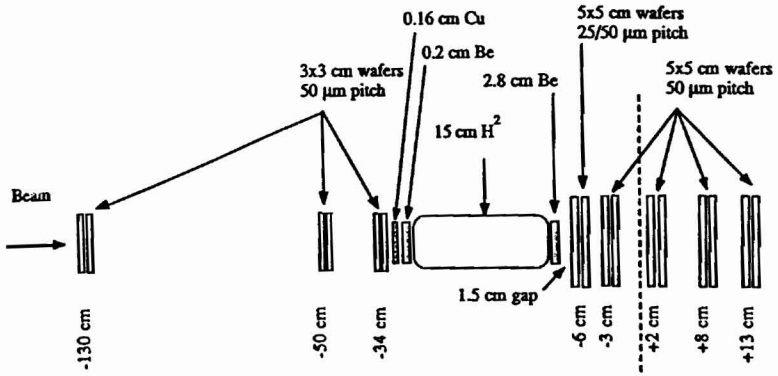


Figure 7.11 Direct photon inclusive invariant cross section for the π^-Li data as a function of p_T averaged over x_F. The errors are statistical only. The solid and dotted lines are the QCD predictions with optimized scales and the Duke and Owens sets 1 and 2 structure functions respectively.



M WEST SPECTROMETER



Target Region

E-706 (Slattery) A Comprehensive Study of Direct Photon Production in Hadron Induced Collisions

UC/Davis, Delhi (India), Fermilab, Michigan State, Northeastern, Oklahoma, Pennsylvania State, Pittsburgh, Rochester

Status: *Data Analysis*

E-706 is a second generation fixed target experiment to study events containing high transverse momentum direct photons produced in hadronic interactions. Only two leading order diagrams contribute to direct photon production: the QCD Compton diagram ($q + g \rightarrow q + \gamma$) and the quark-antiquark annihilation process ($\bar{q} + q \rightarrow g + \gamma$). Next-to-leading order QCD calculations now eixst for both inclusive direct photon cross sections and for direct photon plus jet production.

The physics goals of E-706 include measuring the gluon structure function of the nucleon and the charged pions. The E-706 data for incident mesons is at a significantly higher CM energy (31 GeV) than previous experiments, which are clustered at CM energies between 19 and 24 GeV. The study of direct photon plus jet events (including $\gamma\gamma$ production) provides sensitive tests of next-to-leading order QCD predictions. Direct photon data also provide input to quark and gluon fragmentation studies.

Since electromagnetic decays of neutral pions are the primary source of background to direct photon data, precision measurements of neutral pion cross sections are an essential part of this experimental program. These measurements are of interest in their own right since they provide insight into hard scattering processes. Next-to-leading order calculations of large transverse momentum neutral pion production have also recently become available.

The MWest spectrometer, which was simultaneously employed to acquire data for E-706 and E-672, is a large acceptance multiparticle spectrometer. The MWest beamline includes spoilers to reduce the muon flux incident upon the spectrometer, and a differential Cerenkov counter to identify incident particle types. Veto walls and hadron shielding upstream of the target minimize the impact of incident beam halo on the experiment. There are six planes of 50 μm pitch silicon strip detectors upstream of the target. Different targets allow for investigation of the nuclear dependence of the various processes. Immediately downstream of the target is a pair of silicon strip detectors, with 25 μm pitch in the central region and 50 μm pitch on their outer edges, followed by eight additional silicon strip planes of 50 μm pitch. The large aperture (122×91 cm^2) conventional analysis magnet provides a transverse impulse of 450 MeV to charged particles. Downstream of the magnet are four proportional wire chamber modules, each containing four planes with 2.54 mm pitch. There are also two straw tube drift chambers, each with four planes in each of two views. The drift chamber resolutions are 300 μm and 250 μm per plane, respectively. The finely segmented, focused electromagnetic lead and liquid argon calorimeter has a radius of 1.6 m and is located 9 m downstream of the target. The standard deviation of

the reconstructed π° mass peak is 8 MeV, while that of the η is 24 MeV. A steel hadronic calorimeter is located behind the electromagnetic calorimetry within the liquid argon cryostat. An iron and scintillator calorimeter intercepts the forward cone passing through a central hole in the liquid argon calorimeters. Downstream of the forward calorimeter is a muon identification system provided by E-672. For the purposes of E-706, the spectrometer triggers upon large transverse momentum electromagnetic showers detected in the liquid argon calorimeter.

The MWest spectrometer was commissioned during the 1987-1988 fixed target run. Approximately 5 million physics-quality triggers were recorded during that run using positive and negative 500 GeV beam on copper and beryllium targets. This data sample corresponds to a sensitivity of about 0.5 events per picobarn for the negative beam and about 0.8 events per picobarn for the positive beam. Seventeen students have completed their Ph.D. research using this data sample. These students have investigated a wide variety of topics including neutral pion production at low transverse momentum, neutral pion and eta production at high transverse momentum, direct photon production at high transverse momentum, recoiling jet structure in high transverse momentum events, fragmentation properties of strange particles produced in high transverse momentum hadronic interactions, neutral pion pair production, characteristics of forward energy production, and leading particle production at 800 GeV.

Inclusive high transverse momentum neutral pion and direct photon cross section measurements for incident negative pions and protons at 500 GeV have recently been published (PRD 45, R3899 and PRL 68, 2584). A more detailed paper on this analysis has been prepared. The analysis of jets recoiling from high transverse momentum electromagnetic triggers acquired in this initial data run is nearly complete. Cross sections for neutral-pion-plus-jet and photon-plus-jet production have been presented at the November 1992 DPF meeting at Fermilab. Comparisons of angular distributions for the photon and neutral pion triggered events were also presented. A paper on these topics is in preparation.

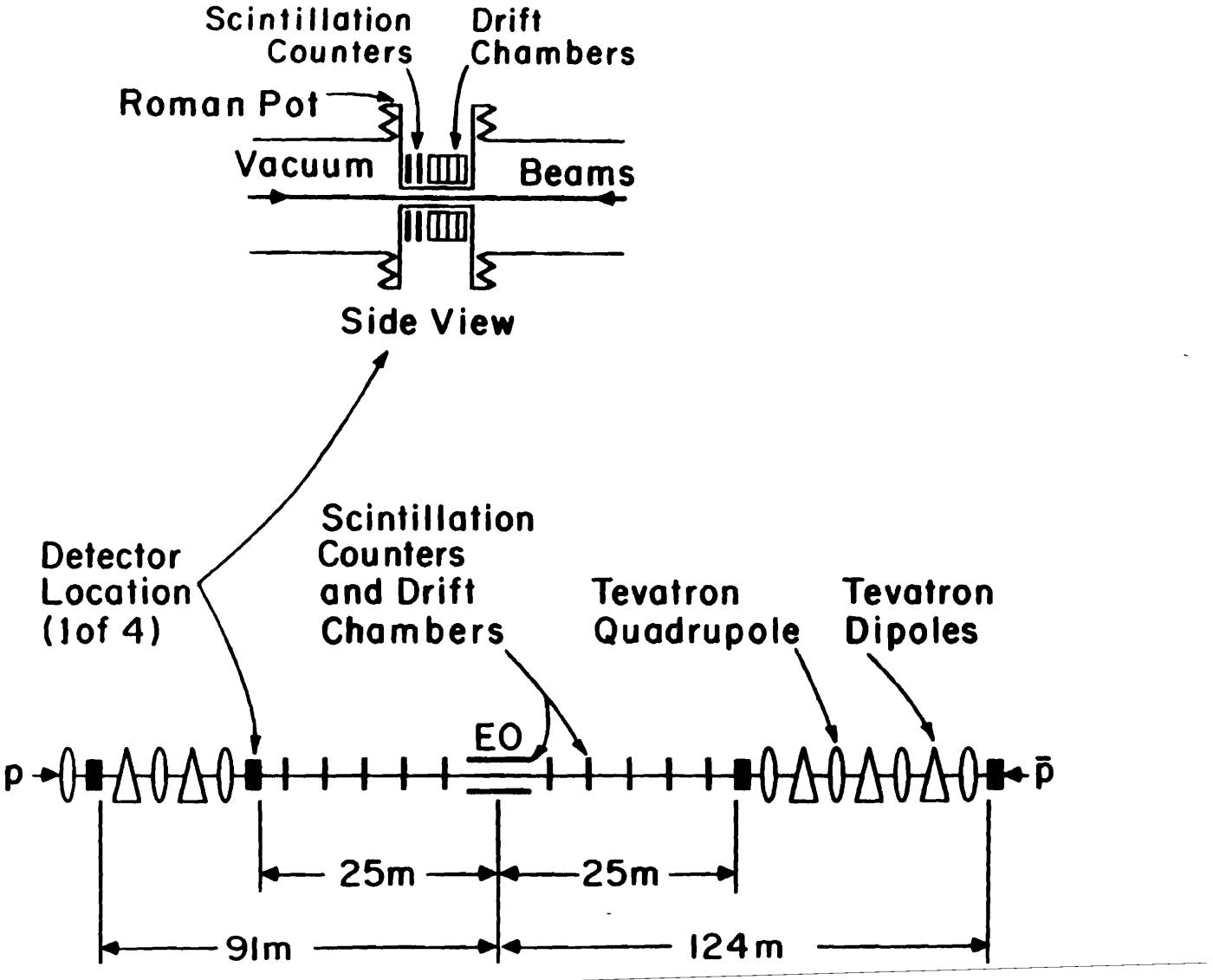
During the 1990 fixed target run, about 30 million triggers induced by a negative 530 GeV beam incident on beryllium and copper targets were recorded. These data provide more than a factor of fifteen increase in sensitivity relative to that acquired during our initial run. Prior to the 1991 fixed target running, a 0.02 interaction length liquid hydrogen target was installed. During 1991, we accumulated 23 million triggers using an 800 GeV primary proton beam incident on hydrogen, beryllium, and copper targets. This data sample corresponds to a sensitivity of about ten events per picobarn. An additional 14 million triggers induced by a 530 GeV positive beam incident upon the same targets were also accumulated during this run. These data represent a sensitivity of about ten events per picobarn. A smaller sample (4 million triggers) of negative 530 GeV beam induced data was also recorded during the 1991 running, and will provide the opportunity to investigate nuclear dependence effects in the negative data, and also help establish the relative normalization of the 1990 and 1991 data samples.

It is expected that within the next two years at least sixteen additional graduate students will complete their Ph.D. research using data accumulated during the 1990-91 fixed target runs. We will measure the cross section for neutral pion, eta, and direct photon production at high transverse momentum by

both positive and negative 530 GeV beams as well as by 800 GeV primary protons. High statistics studies of photon-plus-jet and neutral-pion-plus-jet events will also be carried out. We also have the capability to study the inclusive production of low transverse momentum neutral pions and kaons. The variety of targets employed in this experiment will allow us to investigate the nuclear dependence of these results. We can also study leading particle production at 800 GeV.

The large acceptance MWest multiparticle spectrometer has already demonstrated its power and versatility. The large statistics, high quality direct photon data samples acquired by E-706 will provide unique insights into hadronic structure and QCD dynamics.

E-710


Scintillation Counters
Drift Chambers
Roman Pot
Vacuum
Beams
Side View
Detector Location (1of 4)
Scintillation Counters and Drift Chambers
Tevatron Quadrupole
Tevatron Dipoles
EO
p
p̄
25m
25m
91m
124m

E-710 (Orear / Rubinstein) Measurements of Elastic Scattering and Total Cross Sections at the Fermilab $\bar{p}p$ Collider

Bologna (Italy), Cornell, Fermilab, George Mason, Maryland, Northwestern

Status: *Data Analysis*

The goal of this experiment is to measure the $\bar{p}p$ total cross section, the logarithmic slope of the elastic scattering distribution, and ρ (the ratio of the real to imaginary part of the forward scattering amplitude) at energies from $\sqrt{s}$ = 300 GeV to 1.8 TeV. Preliminary results at $\sqrt{s}$ = 1.8 TeV were obtained in the 1987 Collider run, and final data during the 1988/89 Collider run.

The experiment was located around the Tevatron E0 $\bar{p}p$ interaction point. Detectors (scintillation counters and high precision drift chambers) for registering small angle scattering in the vertical plane were located in Roman Pots, thin-walled re-entrant vessels which could be moved remotely, allowing the detectors to be placed close to the circulating beams. A pair of these pots was symmetrically placed, one above and one below the circulating beams. There were four such pairs, one each at the two ends of the 50m E0 straight section, and the others located about 100m from E0 at the D47 and E14 locations in the Tevatron lattice. The beam optics were such that the effective distances to these latter pairs were about 80m in the vertical plane, allowing detection of scattering at very small angles. Located around the E0 straight section beam pipe were 48 scintillation counters and 16 small drift chambers used to measure the total inelastic counting rate.

The experiment covered a $|t|$ range from the Coulomb region to 0.01 $(GeV/c)^2$ at $\sqrt{s}$ = 300 GeV and to 0.6 $(GeV/c)^2$ at $\sqrt{s}$ = 1.8 TeV. Data was normalized with use of the total interaction rate measured using all of the detectors.

Data taking was completed in June 1989, and analysis has been underway since then. Among the results obtained so far are, at $\sqrt{s}$ = 1.8 TeV,

$$\sigma_T = 72.8 \pm 3.1 \text{mb}; \quad \rho = 0.140 \pm 0.069; \quad \sigma_{\text{single diffraction}} = 9.4 \pm 1.4 \text{mb};$$

the logarithmic slope of elastic scattering is constant within errors over the range $0.034 \leq |t| \leq 0.65$ $(GeV/c)^2$. The value of ρ fits the prediction based on previously existing pp and $\bar{p}p$ σ_T and ρ data (except for a UA4 value at $\sqrt{s}$ = 546 GeV), and no new physics, as had been suggested earlier, is needed to fit this result.

Current analysis efforts are now on the data taken at the lower energies.

Publications

Drift Pots for Small Angle Elastic Scattering at the Fermilab Collider, N. A. Amos et al., Nucl. Inst. & Meth. A252, 263 (1986).

Measurement of the Nuclear Slope Parameter of the $\bar{p}p$ Elastic-Scattering Distribution at $\sqrt{s}$ = 1800 GeV, N. A. Amos et al., Phys. Rev. Lett. 61, 525 (1988).

Measurement of the $\bar{p}p$ Total Cross Section at $\sqrt{s}$ = 1.8 TeV, N. A. Amos et al., Phys. Rev. Lett. 63, 2784 (1989).

A Luminosity Independent Measurement of the $\bar{p}p$ Total Cross Section at $\sqrt{s}$ = 1.8 TeV, N. A. Amos et al., Phys. Lett. B243, 158 (1990).

Antiproton-Proton Elastic Scattering at $\sqrt{s}$ = 1.8 TeV from $|t|$ = 0.034 to 0.65 $(GeV/c)^2$, N. A. Amos et al., Phys. Lett. B247, 127 (1990).

Measurements of Proton-Antiproton Elastic Scattering at $\sqrt{s}$ = 1.8 TeV at the Fermilab Tevatron Collider, N. A. Amos et al., Revista Colombiana de Fisica, Vol. 23, No. 1 (1991).

Measurement of ρ, the Ratio of the Real to Imaginary Part of the $\bar{p}p$ Forward Elastic Scattering Amplitude, at $\sqrt{s}$ = 1.8 TeV, N. A. Amos et al., Phys. Rev. Lett. 68, 2433 (1992).

Antiproton-Proton Elastic Scattering at $\sqrt{s}$ = 1020 GeV, N. A. Amos et al. (Nuovo Cimento A, to be published).

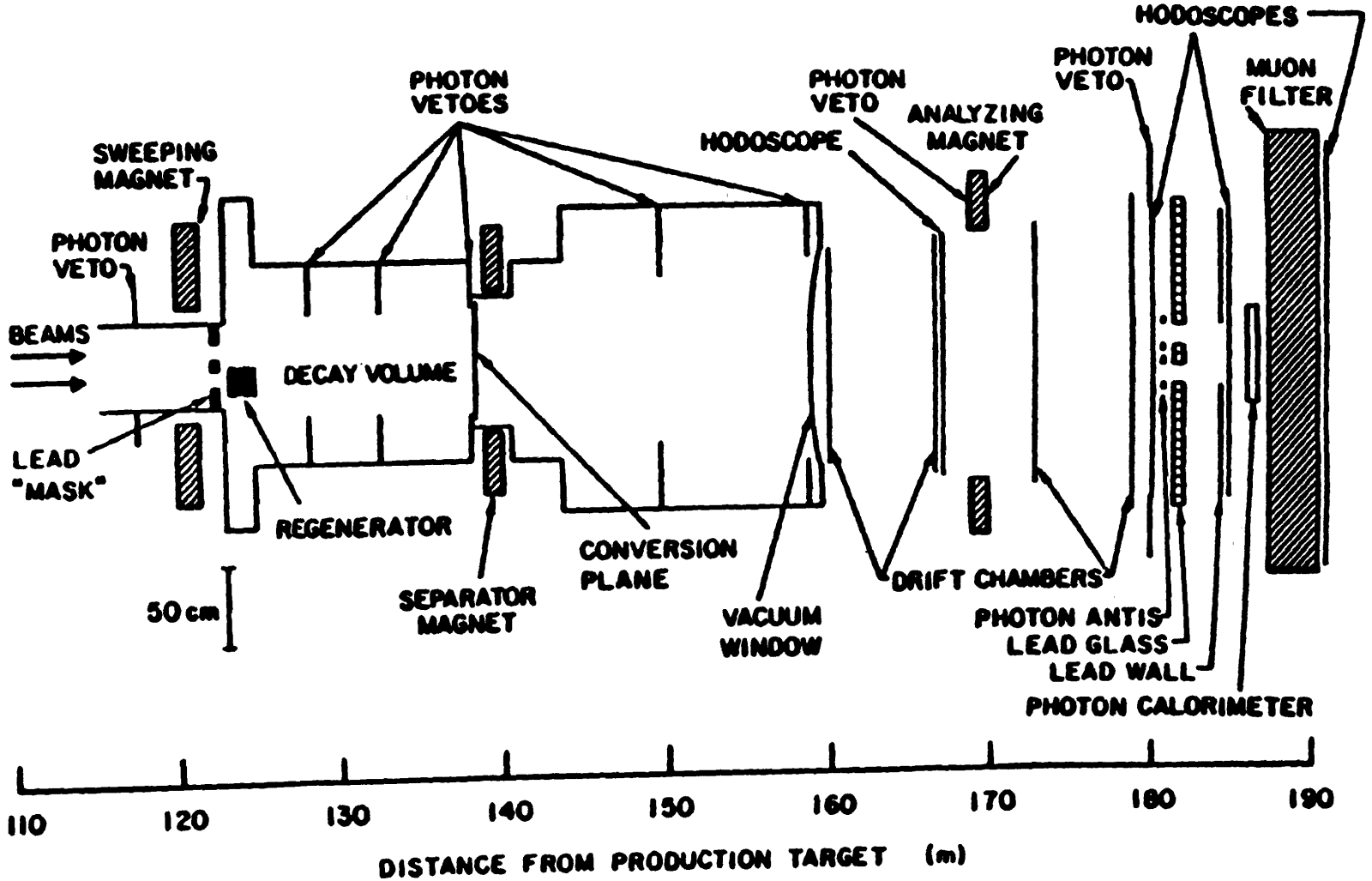
Diffraction Dissociation in $\bar{p}p$ Collisions at $\sqrt{s}$ = 1.8 TeV, N. A. Amos et al. (Physics Letters, to be published).

Theses

M. Bertani, R. Mondardini, I. Veronesi (Bologna); D. Dimitroyannis (Maryland); C. Guss (Northwestern).

Major Conference Reports

Colliders to Supercolliders, Madison, 1987; APS Particles and Fields, Storrs, 1988; International Europhysics Conference on HEP, Madrid, 1989; International Conference on Elastic and Diffractive Scattering, Northwestern, 1989; Physics in Collision, Duke, 1990; International Conference on Elastic and Diffractive Scattering, Elba, 1991; Lepton-Photon Conference, Geneva, 1991; APS Particles and Fields, Vancouver, 1991; Physics in Collision, Boulder, 1992.


HODOSCOPES
PHOTON VETO
MUON FILTER
PHOTON VETOES
PHOTON VETO
ANALYZING MAGNET
HODOSCOPE
SWEEPING MAGNET
PHOTON VETO
BEAMS
DECAY VOLUME
LEAD "MASK"
REGENERATOR
CONVERSION PLANE
SEPARATOR MAGNET
VACUUM WINDOW
DRIFT CHAMBERS
50 cm
PHOTON ANTIS
LEAD GLASS
LEAD WALL
PHOTON CALORIMETER
110
120
130
140
150
160
170
180
190
DISTANCE FROM PRODUCTION TARGET (m)

E-731 (Winstein) A Precision Measurement of the CP Violation Parameter (ε'/ε) in the Neutral Kaon System

Chicago, Elmhurst, Fermilab, Princeton, Saclay (France)

Status: *Data Analysis*

The goal of this experiment is a measurement of the ratio of the CP nonconservation parameters, ε'/ε, in the K^0-$\bar{K}$ system to a precision of $\pm.0007$.

So far the only manifestations of CP nonconservation are a result of a lack of time symmetry in the $\Delta S = \pm 2$ processes $K^0 \leftrightarrow \bar{K}$. This experiment addresses the issue as to whether the CP nonconservation is confined to a $\Delta S = 2$ interaction (the superweak model) or has a $\Delta S = 1$ component, as naturally arises in, for example, the Kobayashi-Maskawa model. Although there is considerable uncertainty in the predictions for the size of ε'/ε, this measurement would severely constrain the models and, if non-zero, would give an important new "handle" on the phenomenon of CP nonconservation.

The experiment makes use of a double beam whereby both K_L and K_S decays are studied simultaneously: a thick B_4C regenerator is placed in one of the beams to provide a K_S component and the regenerator is alternated from beam to beam to reduce the effects of any detector asymmetries.

For this effort, a new neutral beam has been constructed which takes full advantage of the 800 GeV primary protons and the superior duty cycle of the Tevatron to provide a factor of five higher usable K_L flux in the 100 GeV/c region than ever before at Fermilab. Attention has also been paid to significantly reducing other sources of background which traditionally plague high sensitivity neutral kaon experiments: soft neutrons and photons.

The neutral final state is detected with an 800 element 1.9m diameter lead glass array while the $\pi^+\pi^-$ are detected with a 2000 sense wire high rate drift chamber spectrometer. Triggering in the neutral mode is effected by counting clusters in the lead glass. The most serious background, $K_L \rightarrow 3\pi^0$ is greatly reduced by means of several anticoincidence planes designed to detect extra gammas outside the solid angle of the lead glass. Inelastic regeneration is significantly reduced by means of hodoscope planes within the regenerator to detect the production of secondaries.

E-731 finished data-taking in February 1988. The data statistics were as follows: 300K $K_L \rightarrow 2\pi^0$ events, 370K $K_L \rightarrow \pi^+\pi^-$ events, and 1M each of $K_S \rightarrow 2\pi^0$ and $K_S \rightarrow \pi^+\pi^-$. Several results have been published based on a 20% subset of the data. The value of $\mathrm{Re}(\varepsilon'/\varepsilon)$ obtained from the 20% subset is $-0.0004 \pm 0.0014 \pm 0.0006$ (E-731, 20%).

Since then, the remaining 80% of data have been analyzed with much better understanding of the acceptance, energy resolution, and of the

backgrounds. These have allowed major reduction in the systematic error. The 20% data sample was re-analyzed with little change in its central value of ε'/ε, which is −0.0001. The preliminary result from the full E-731 data set, given at Fermilab, Lepton-Photon at Geneva, DPF at Vancouver in the summer of 1991, is

$$\varepsilon'/\varepsilon = (6.0 \pm 5.8\ (\text{stat.}) \pm 3.2\ (\text{syst.}) \pm 1.8\ (\text{monte carlo})) \times 10^{-4}$$

which combines to

$$\varepsilon'/\varepsilon = (6.0 \pm 6.9) \times 10^{-4}. \qquad \text{(E-731 full data sample)}$$

This result is still consistent with zero, in agreement with the superweak model, though it can still be accommodated in the standard model.

The same 2π data have also been fitted for other parameters of the neutral kaon system, using exactly the same techniques of background subtraction and acceptance corrections. The results, where both statistical and systemactic errors are included, are

$\tau_S = (0.8912 \pm 0.0013) \times 10^{-10}$ sec;
$\Delta m = m_L - m_S = (0.5339 \pm 0.0034) \times 10^{10}\ \hbar\ \text{sec}^{-1}$;
$\phi_{+-} = (43.2 \pm 1.6)°$;
$\Delta\phi = \phi_{00} - \phi_{+-} = (-0.6 \pm 1.6)°$.

These results are either comparable to or exceed in precision the best previous determinations.

The ε'/ε result has led the group to propose a new experiment P-832 to measure ε'/ε to a precision at 1×10^{-4} in the near future.

There are other rare decay results from the E-731 data analysis, which are listed as follows:

Process	Branching Ratio	
$K_L \to \pi^0 ee$	$< 7.5 \times 10^{-9}$ (90% CL)	
$K_L \to \pi^0\gamma\gamma$	$(1.86 \pm 0.88) \times 10^{-6}$	
$K_L \to \pi^0 e\pi\nu$	$(5.1 \pm 0.5) \times 10^{-5}$	720 events
$K_L \to \pi^+\pi^-\gamma$ (IB)	$(1.40 \pm 0.05) \times 10^{-5}$	$E_\gamma^* > 20$ MeV
$K_S \to \pi^+\pi^-\gamma$ (IB)	$(4.59 \pm 0.14) \times 10^{-3}$	$E_\gamma^* > 20$ MeV
$K_L \to \pi^+\pi^-\gamma$ (DE)	$(3.04 \pm 0.14) \times 10^{-5}$	
$\eta_{+-\gamma}$	$(2.6 \pm 0.5 \pm 0.2) \times 10^{-3}$	first observation
$\phi_{+-\gamma}$	$(41 \pm 28 \pm 11)°$	first observation

The effort on the K_L rare decay analysis has led to the new experiment E-799 to search for the direct CP violation decay in $K_L \to \pi^0 ee$ and many other rare decay modes.

Publications

First Result on a New Measurement of ε'/ε in the Neutral Kaon System, M. Woods et al., Phys. Rev. Lett. 60, 1695 (1988).

New Limits on $K_{L,S} \rightarrow \pi^0 e^+ e^-$, L. Gibbons, et al., Phys. Rev. Lett. 61, 2661 (1988).

Search for $K_L \rightarrow \pi^0 \gamma\gamma$, V. Papadimitriou et al., Phys. Rev. Lett. 63, 28 (1989).

A Cluster Finding Trigger Processor, M. Asner et all, NIM A291, 577 (1990).

A Determination of $Re(\varepsilon'/\varepsilon)$ by the Simultaneous Detection of the Four $K_{L,S} \rightarrow \pi\pi$ Decay Modes, J. R. Patterson et al., Phys. Rev. Lett. 64, 1491 (1990).

New Limit on $K_L \rightarrow \pi^0 e^+ e^-$, A. Barker et al, Phys. Rev. D41, 3546 (1990).

Test of CPT Symmetry Through a Determination of the Difference in the Phases of η_{00} and η_{+-} in $K \rightarrow 2\pi$ Decays, M. Karlsson et al., Phys. Rev. Lett. 64, 2976 (1990) .

Measurement of the Branching Ratio of the Decay $K_L \rightarrow \pi^0 \gamma\gamma$, V. Papadimitriou et al., Phys. Rev. D44, 573 (1991).

A Measurement of the Quadratic Slope Parameter in the K_L to $3\pi^0$ Decay Dalitz Plot, S. Somalwar et al., Phys. Rev. Lett. 68, 2567 (1992).

A Search for the Decay K_L to $\pi^0 \nu\bar{\nu}$, G. Graham et al., accepted by Phys. Lett. B.

Major Conferences

B. Winstein, Proc. Joint International Lepton-Photon Symposium and Europhysics Conference on HEP, Geneva (1991).

Y. Wah, Proc. of XXVI International Conf. on HEP, Dallas (1992).

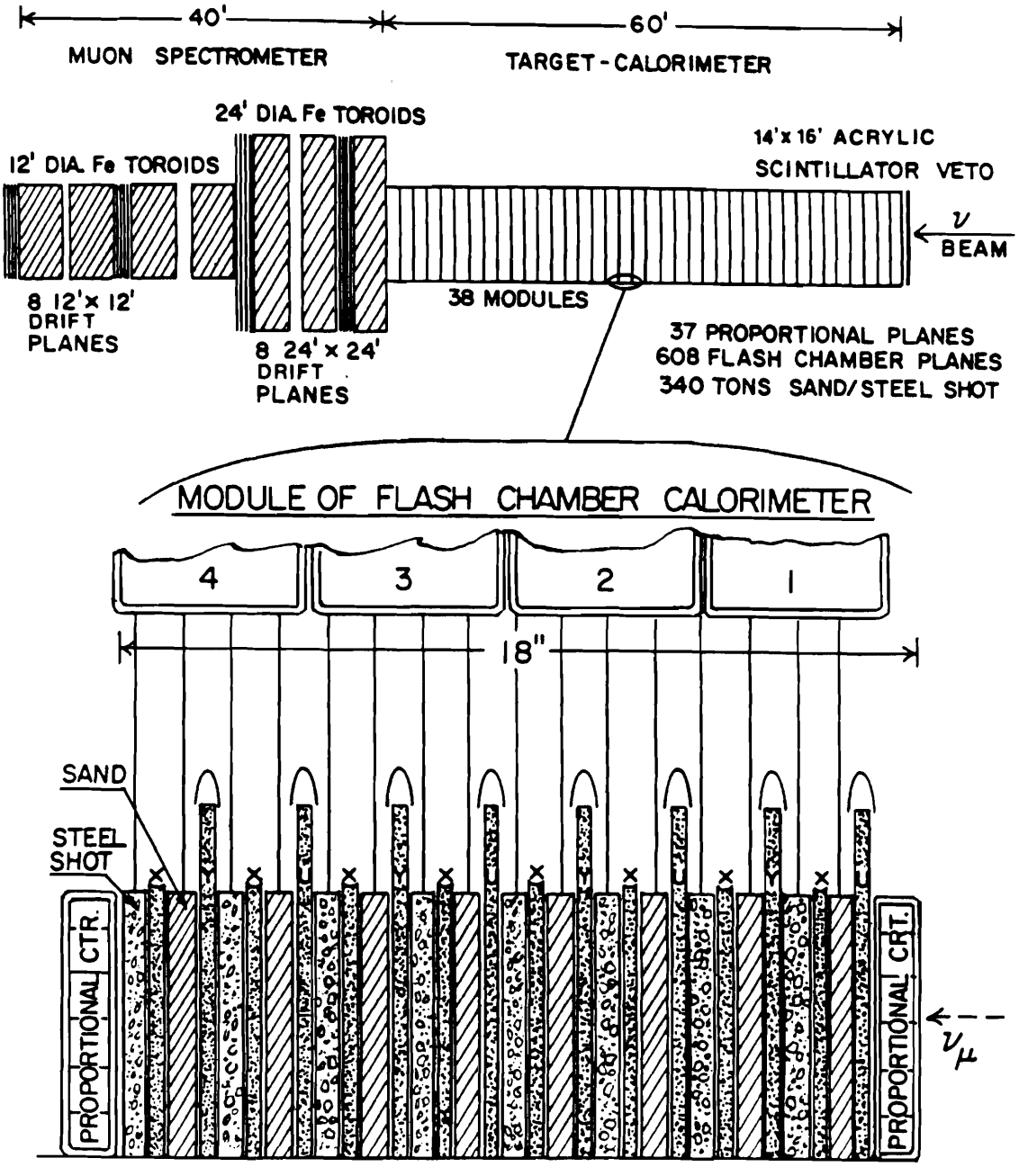
Theses

M. Woods, Chicago, ε'/ε, 1988.
R. Patterson, Chicago, ε'/ε, 1990.
V. Papadimitriou, Chicago, $K_L \rightarrow \pi^0 \gamma\gamma$, 1990.
G. Grazer, Princeton, $\Delta\phi$, 1988.
M. Karlsson, Princeton, $\Delta\phi$, 1988.
P. Jarry, Saclay, ε'/ε, 1988.

There should be seven more papers which will complete the analysis of E-731 data. These will be

1. Final ε' result
2. Better results (than PDG) on K_S lifetime and K_L/K_S mass difference
3. η_{00} - η_{+-} phase
4. K_S, $K_L \rightarrow \pi\pi\gamma$ branching ratios
5. Interference in K_L, $K_S \rightarrow \pi\pi\gamma$
6. K_{e4} branching ratio and form factor analysis
7. $K_L \rightarrow \pi^+\pi^-\pi^0$ branching ratio

E-733


40'
60'
MUON SPECTROMETER
TARGET-CALORIMETER
24' DIA. Fe TOROIDS
12' DIA. Fe TOROIDS
14'x 16' ACRYLIC
SCINTILLATOR VETO
ν
BEAM
8 12'x 12'
DRIFT
PLANES
8 24'x 24'
DRIFT
PLANES
38 MODULES
37 PROPORTIONAL PLANES
608 FLASH CHAMBER PLANES
340 TONS SAND/STEEL SHOT
MODULE OF FLASH CHAMBER CALORIMETER
4
3
2
1
18"
SAND
STEEL
SHOT
PROPORTIONAL CTR.
PROPORTIONAL CTR.
ν_μ

E-733 (Brock) The Study of High Energy Neutrino Interactions with the Tevatron Quadrupole Triplet Beam

Fermilab, Florida, MIT, Michigan State

Status: *Data Analysis*

The goal of this experiment is to study neutrino interactions in the first neutrino beam to be produced at the Tevatron. The detector for this experiment is the 300 ton Flash-Chamber Proportional-Tube Calorimeter constructed by the Fermilab, MIT, Michigan State Collaboration in Lab C. The primary feature of this detector is the fine-grain sampling which allows for the measurement of the direction of hadron showers. Shower energy at the Tevatron will be determined by measuring the pulse height in the proportional tubes and muon momenta will be determined by large drift planes which are in the 12' and 24' toroidal magnets downstream of the calorimeter. The layout of the detector is shown on the accompanying figure.

The physics of interest in this new regime (beyond the establishment of well-known behavior such as scaling) involves a number of reactions which have been hinted at in lower energy experiments.

1. Same-sign dimuon production. All previous high energy experiments have seen evidence of same-sign dimuon production beyond that expected from background or theory. A characteristic of these observations seems to be the indication of a threshold, suggesting that higher energy would be useful in further studies. Of great interest will be the study of the missing transverse energy and possible correlations of that energy with the muons and hadron shower. This experiment can contribute to this puzzle because of the good angular resolution for hadron showers.

2. Weak neutral currents. Because of the ability of this detector to measure the energy and direction of the hadron shower, information about weak neutral currents can be gained in new energy regimes which will allow for comparisons of neutral current models and a measurement of the Weinberg Angle.

The following are topics under analysis:

1. $Sin^2\theta_W$. Preliminary results on the extraction of the Weinberg angle have been presented. We were able to show that, for a restricted fiducial volume, the measurable quantity R is

$$R = 0.305 \pm 0.006$$

where the error is a combination of statistical and systematic errors in roughly equal amounts. The early indications are that this leads to a Weinberg angle of

$$\mathrm{Sin}^2\theta_W = 0.235 \pm 0.009$$

where the uncertainty includes only the experimental uncertainties. This uncertainty is roughly equal to that of the previous combination of the Lab E published results. We expect to be able to reduce these uncertainties by roughly 50% and we are presently occupied in the analysis which will lead to that reduction.

2. Charged currents. The determination of charged current structure functions will use all of the charged current data taken in this device throughout its lifetime. This will include roughly 25,000 events from E-594 plus, hopefully, 100,000 events from E-733. While this sample does not compete with the enormous statistics of Lab E, we have all learned the importance over the last ten years of multiple measurement of these quantities from different experiments. The lever-arm in Q^2 with the unpublished E-594 data will be substantial.

   This analysis has been slowed up by the item that always makes neutrino structure function analyses difficult: hadron energy calibration. In the Lab C detector, this has always been a problem due to the digital nature of the device and the sensitivity of it to the climatic changes inherent in a nine-month run. It is for that reason that we always insisted on continuous calibration beams between each pair of neutrino pings and that has saved this analysis.

3. Dimuons. We have already finished one analysis, and are now extending this analysis into the 1987 run. A comparison of data (which will be about 1,000 opposite sign dimuons) with GEISHA for shower shapes (longitudinal and lateral) from hadrons of 35-400 GeV as well as the muon production from showers of a given energy are interesting in their own rights and we are collecting this information for publication now. There is no better detector in the world for such fine details of shower topologies than ours and this will be an important ingredient in any future simulation for the design of a Tevatron or SSC (or LHC?) detector.

4. WIMPs. Here the task was to measure the time of events which occur in the detector relative to the RF clock. Events which fall between buckets would be a signal for heavy penetrating objects. We have successfully measured the timing resolution of the scintillator which we installed before the last run to be about 1 nsec, as we predicted. This leads us to a lower mass limit of about 500-1000 MeV/c^2. We are now using the muons from charged current events (which we can time-sum accurately when they cleanly strike a scintillator) to calibrate the measurement of the time of hadron showers. Since we have multiple measurements of the time of each event, we can do this. We presently are close to 1 nsec for these types of events as well, although the final bit is difficult.

   Once this is accomplished we can, in a model-independent fashion, set a limit on any physics reaction (heavy leptons, WIMPs, SUSY, ??) by pattern-recognizing the characteristics of the event and setting a CL based on seeing no events (?) within a window.

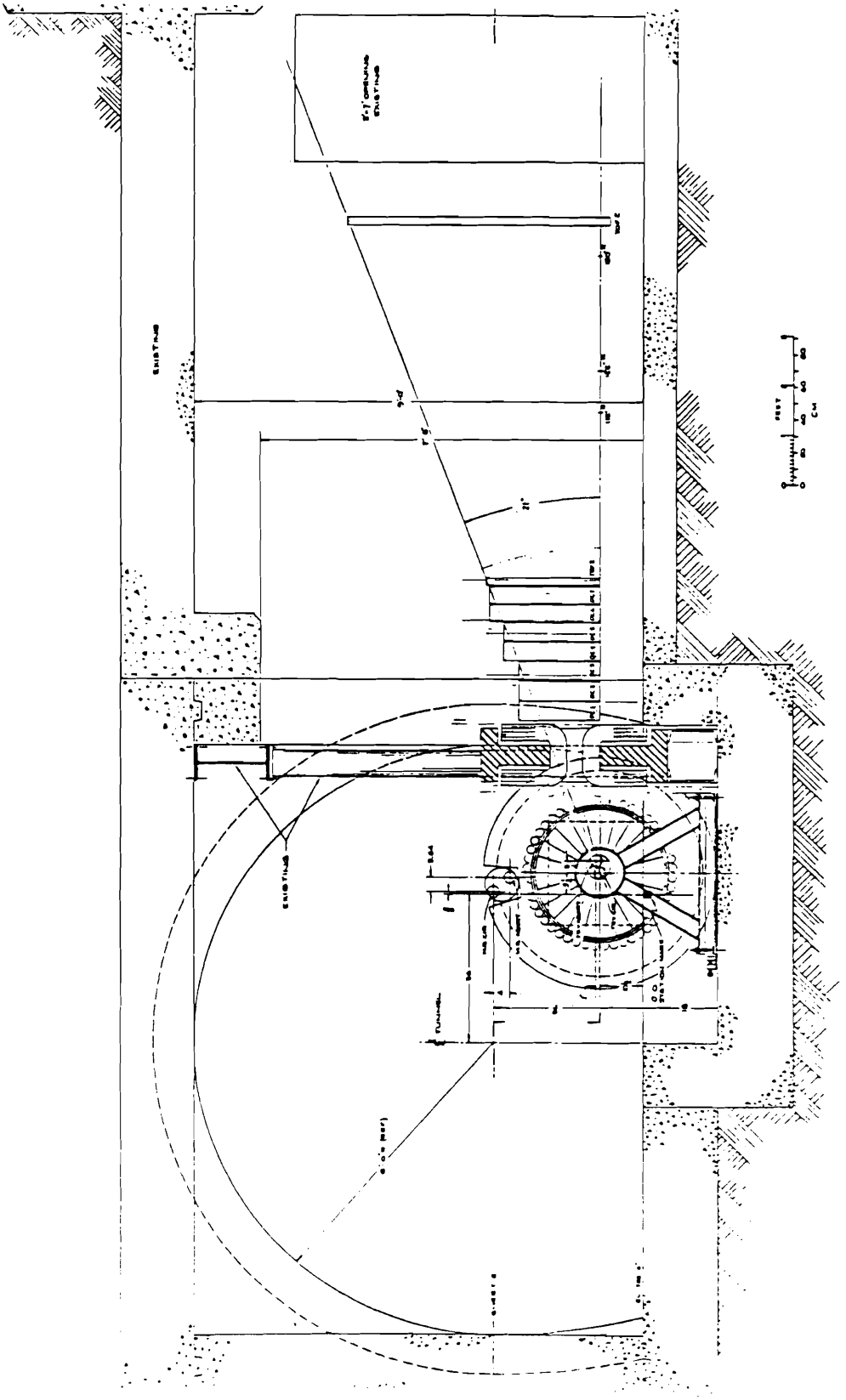
Publication

Hadron Showers in a Low-Density Fine-Grained Flash Chamber Calorimeter, NIM A278, 447 (1989).

Thesis

Opposite-Sign Dimuon Production in High Energy Neutrino-Nucleon Interactions, Boris Strongin, MIT.

E-735



E-735 (Gutay) Search for Quark-Gluon Plasma in $p\bar{p}$ Collisions at $\sqrt{s}$ = 1.8 TeV

Duke, Fermilab, Iowa State, Notre Dame, Purdue, Wisconsin

Status: *Data Analysis*

Two proposed signatures of the formation of quark-gluon plasma (QGP) are a transition in the p_t vs N_c curve (rise, plateau, and 2nd rise) and an increase in strangeness production with N_c. To look for these signatures, E-735 proposed to measure charged multiplicity (N_c) over most of 4π and measure p_t and particle type for charged tracks emitted in the central collision region. To carry out the measurements the experiment consisted basically of two parts: (1) a central detector surrounding the interaction point in the C0 intersection hall to count charged particles from the $p\bar{p}$ collisions and (2) a spectrometer at the side to identify and momentum analyze a sample of charged tracks at small pseudo-rapidity. A minimum bias trigger required hits in forward and backward TOF counters surrounding the beampipe.

E-735 has published three PRL papers and presented data at many conferences based on analysis of data from the first run (see following publication list). The first paper presented a p_t vs N_c curve which showed a rise, a plateau and hints of a second rise. The second paper showed that lambda p_t and production increased substantially from ISR energies. The third paper presented several aspects of π, K and p production: K/π , p/π ratios vs N_c and vs p_t, and p_t vs N_c for each particle type. Although none of these results prove QGP formation, they place important constraints on QGP and other multiparticle production models. Current analysis efforts involve using data from the much higher statistics second run. The analysis in the first three papers will be repeated but with great effort to reduce systematic errors. Extensive Monte Carlo simulations are underway to understand detector acceptance. In addition to these studies, analysis is being done in several other areas. Hanbury-Brown and Twiss correlation studies are being used to obtain radii of the interaction volume. Production of φ's, K^0's, cascades and omegas is being studied. TOF and dE/dx measurements are being used in searches for anti-d and anti-t. Charged particle multiplicity distributions and intermittency studies are underway as well. Low energy photon production measured with a NaI array in the spectrometer room is being analyzed. It is expected that in the next several months, several more papers will be released showing results of these analyses. Six graduate students obtained PhDs based on analysis of the data from the first run. Currently eight graduate students are analyzing the second run data.

In the first run (1/87-5/87), we obtained 5 million triggers to tape and 150K tracks in the spectrometer. In the second run (7/88-6/89), there were 15 million triggers to tape and 800K tracks in the spectrometer. Higher luminosity and track requirement in the trigger gave a higher track/trigger ratio. Some data was taken also at beam energies of 150 GeV, 273 GeV and 500 GeV.

Ongoing analysis:

1. Energy ($\sqrt{s}$) dependence of particle production and their $<p_t>$ measurement.
2. Transverse momentum (pt) dependence of particle production at $\sqrt{s}$ =1.8 TeV.
3. Energy dependence of the multiplicity distribution.
4. Study of strange particle production at $\sqrt{s}$ =1.8 TeV.
5. Photon production at $\sqrt{s}$ =1.8 TeV.
6. Study of π-π correlations.
7. Comparison of hadron production in $\bar{p}$-p and e^+e^- collisions via the Yang model.

Projects (1) and (2) have been finished and submitted for publication in Phys. Rev. D. A draft of project (3) is written and will be submitted for Phys. Rev. Letters shortly. Work on ϕ, Ξ production is underway. The study of π-π correlations has been finished. The work on the analysis in photon production is in progress.

Publications

T. Alexopoulos et al., Multiplicity Dependence of the Transverse Momentum Spectrum for Centrally Produced Hadrons in Antiproton-Proton Collisions at $\sqrt{s}$ =1.8 TeV, Phys. Rev. Lett. 60, 1622, (1988).

S. Banerjee et al., Lambda0 and Anti-Lambda0 Production from Proton - Antiproton Collisions at $\sqrt{s}$ =1.8 TeV, Phys. Rev. Lett. 62, 12 (1989).

T. Alexopoulos et al., Mass Identified Particle Yields in Antiproton-Proton Collisions at $\sqrt{s}$ =1.8 TeV, Phys. Rev. Lett. 64, 991 (1990).

T. Alexopoulos et al., Hyperon Production from Proton-Antiproton Collisions at $\sqrt{s}$ =1.8 TeV, Phys. Rev. D46, 2773 (1992).

T. Alexopoulos et al., Mass Identified Particle Production in Proton-Antiproton Collisions at $\sqrt{s}$ = 300, 540, 1000 and 1800 GeV, Submitted to Phys. Rev. D.

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S. Banerjee, Notre Dame, Multiplicity Correlations in Proton-Antiproton Collisions at $\sqrt{s}$ =1.8 TeV.

P. Beery, Notre Dame,Two Particle Bose-Einstein Correlations at $\sqrt{s}$ =1.8 TeV.

T. G. Carter, Duke, Photon Production from Proton-Antiproton Collisions at $\sqrt{s}$ =1.8 TeV.

T. McMahon, Purdue, Phase Transition, Thermodynamics and Transverse Momentum Spectra of Mass Identified Hadrons in 1.8 TeV Center of Mass Poton-Antiproton Collisions.

A. P. McManus, Notre Dame, Inclusive Charged Particle Production in Proton-Antiproton Collisions at $\sqrt{s}$ =1.8 TeV.

D. Wesson, Duke, Lambda0 and Anti-Lambda0 Production in Proton-Antiproton Collisions at $\sqrt{s}$ =1.8 TeV.

Sample of Conference Talks given by E-735

F. Turkot, A Quark-Gluon Plasma Search in $p\bar{p}$ at $\sqrt{s}$ = 1.8 TeV. Invited talk presented at the Quark Matter '90 Conference in Menton, France, May, 1990.

N. Porile, Search for Quark-Gluon Plasma in $p\bar{p}$ Collisions at $\sqrt{s}$ =1.8 TeV. Talk given at Rio de Janeiro International Workshop of Relativistic Aspects of Nuclear Physics, August, 1989.

L. Gutay, Deconfinement Signature, Mass Dependence of Transverse Flow and Time Evolution in Antiproton-Proton Collisions at $\sqrt{s}$ =1.8 TeV. Talk presented at the 6th Nordic Meeting on Nuclear Physics, Korpervik, Norway, Aug.10-15, 1989. Published Physica Scripta Vol. T32, 122, 1990.

C. Findeisen, The Search for Quark-Gluon Plasma at E-735. Invited talk given at the 3rd Les Rencontres de Physique de la Vallee d'Aoste, La Thuile, Aosta Valley, Italy, February, 1989.

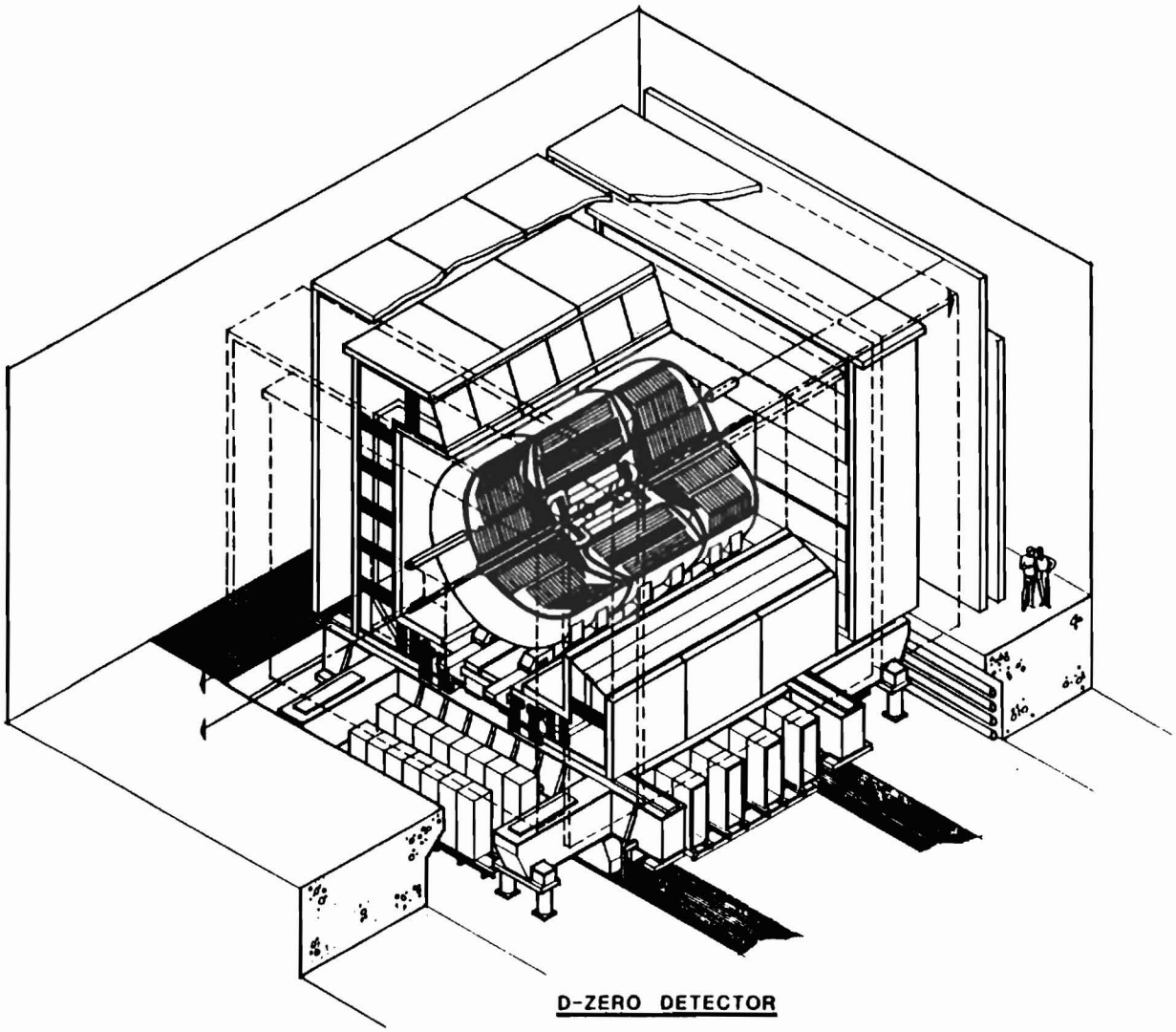
S. Stampke, Measurement of P_t as a Function of N_c at the FNAL $p\bar{p}$ Collider. Invited talk given at Hadronic Matter in Collision '88 Conference, Tucson, Arizona, October, 1988.

C.S. Lindsey, Recent Results from E-735: Search for Quark-Guon Plasma in $p\bar{p}$ Collisions at $\sqrt{s}$ =1.8 TeV. Invited talk at Quark Matter '88 Conf., Lenox, Massachusetts, September, 1988, Nuc. Phys. Vol. A498,181-192 (1989).

T. Alexopoulos et al., A Search for the Signature of a Deconfined Quark Gluon Phase of Strongly Interacting Matter in $\bar{p}p$ Interactions at $\sqrt{s}$ =1.8 TeV, Proceedings of the XXVI International Conference on High Energy Physics, Dallas (1992).

T. Alexopoulos et al., Particle Production, Hadron Deconfinement and Thermodynamics in $p\bar{p}$ Interactions, Proceedings of the NATO Advanced Study Institute on Particle Production in Highly Excited Matter, Il Ciocco (1992).

E-740/823



D-ZERO DETECTOR

E-740 / 823 (Grannis) Study of Events in $\bar{p}p$ Collisions at 2 TeV in the D0 Detector

los Andes (Colombia), Arizona, BNL, Brown, UC/Riverside, CBPF (Brazil), CINVESTAV (Mexico), Columbia, Delhi (India), Fermilab, Florida State, Hawaii, IHEP/Serpukhov (Russia), Illinois/Chicago, Indiana, Iowa State, LBL, Maryland, Michigan, Michigan State, Moscow State (Russia), New York, Northeastern, Northern Illinois, Northwestern, Notre Dame, Panjab (India), Purdue, Rice, Rochester, Saclay (France), SSCL, SUNY/Stony Brook, Tata (India), Texas/Arlington, Texas A&M

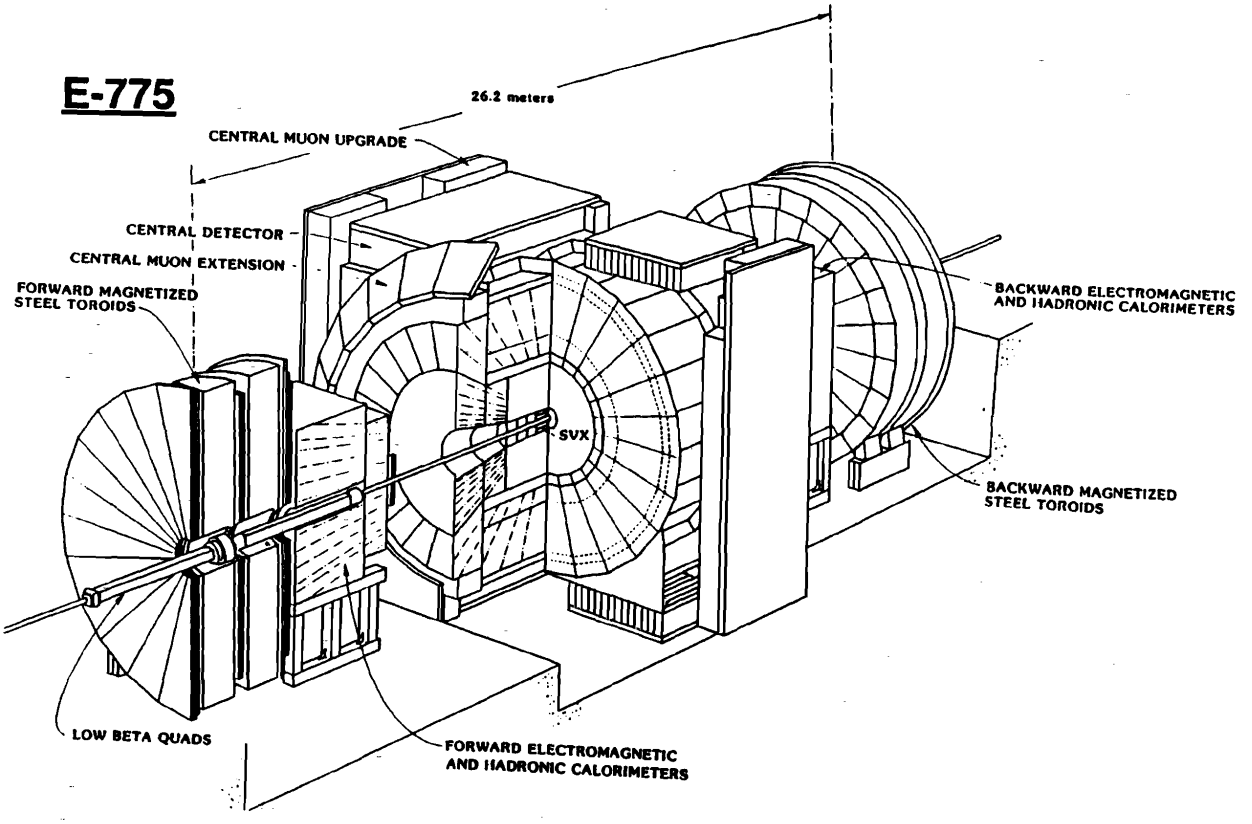
Status: *Data-Taking*

The experiment will study the properties of 2 TeV $\bar{p}p$ collisions with particular emphasis on measurement and identification of leptons (electrons and muons), high transverse momentum jets, and missing energy. Goals of the experiment include the search for and study of the top quark, high statistics studies of the W and Z bosons enabling precision measurements of their masses, widths and production properties; study of high p_T multijet and single photon production for testing QCD; studies of bottom quark state production and searches for new phenomena beyond the standard model such as new quark generations, heavy leptons, supersymmetric particles, technicolor particles, or quark compositeness.

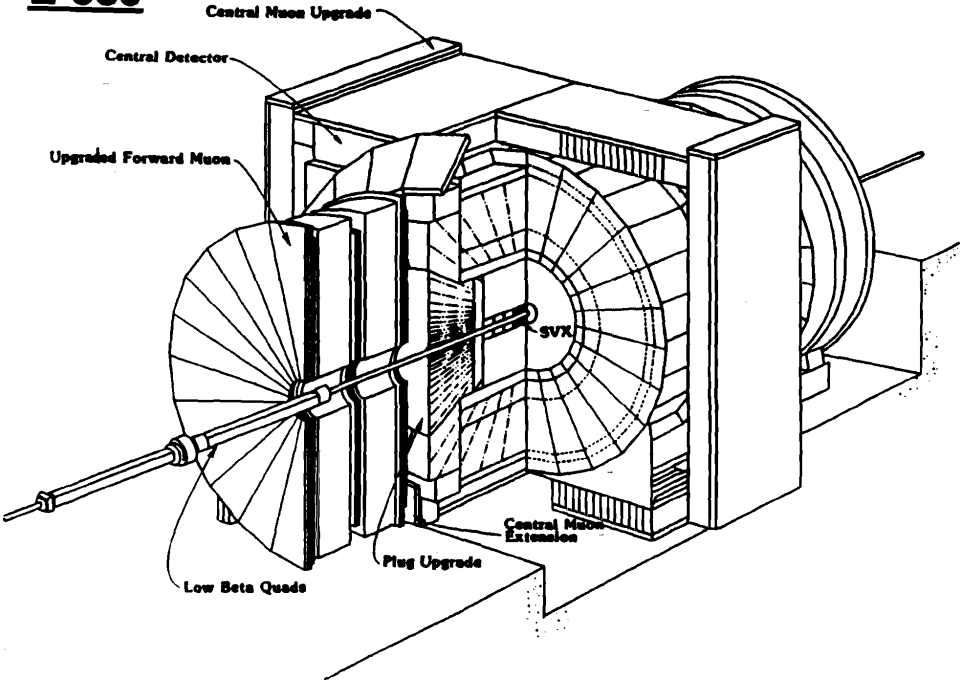
The proposed detector incorporates three main systems: a central detector, uranium-liquid argon calorimetry over nearly 4π solid angle, and a magnetized iron muon spectrometer. The central detector comprises a vertex detector, a multicell transition radiation detector for electron identification, and outer drift chambers in three sections covering down to 5^o with respect to the beams. There is no central magnetic field. The calorimetry is divided into three angular regions and has a projective tower geometry with 50,000 readout channels. Multiple depth segmentation of the combined EM and hadronic calorimeter is made for enhanced identification of electrons. Energy resolution for hadrons has been shown to be $45\%/\sqrt{E}$ with excellent calibration control. The muon system will measure muon momenta to within about 20% up to several hundred GeV/c for angles above 3^o with respect to the beams. Five iron toroids provide the field with position and angle measurements given by corresponding sets of proportional drift tubes.

CDF

E-775



E-830



E-741 / 775 / 830 (Carithers / Shochet) Collider Detector at Fermilab

ANL, Bologna (Italy), Brandeis, Chicago, Duke, Fermilab, Frascati (Italy), Harvard, Illinois, Inst. of Particle Phys.(Canada), Johns Hopkins, KEK (Japan), LBL, Michigan, Michigan State, MIT, New Mexico, Osaka City (Japan), Padova (Italy), Pennsylvania, Pisa (Italy), Pittsburgh, Purdue, Rochester, Rockefeller, Rutgers, SSCL, Texas A&M, Tsukuba (Japan), Tufts, UCLA, Wisconsin, Yale

Status: *E-741 - Data Analysis*
E-775 - Data-Taking
E-830 - No Data Yet

The Collider Detector at Fermilab (CDF) is a general purpose detector system designed to explore the physics of 2 TeV proton-antiproton collisions with the Fermilab Tevatron Collider.

The heart of the CDF central detector is a 3.0 meter long, 1.5 meter radius, 1.5 Tesla superconducting solenoid with tracking chambers in the magnetic field for momentum analysis of charged particles. The solenoid is surrounded by scintillator based calorimeters in the central region covering the angular range ~30° to ~150° with respect to the Tevatron beams, and two "plug" gas calorimeters in the ends of the solenoid completing the calorimeter coverage down to 10°. In all regions the calorimeters are divided into electromagnetic and hadronic sections and have a projective tower geometry to measure energy flow in fine bins of pseudorapidity and azimuth. Muon chambers are located behind the calorimeters. In the forward directions for angles below 10° and down to 2° are additional electromagnetic and hadronic gas calorimeters. The muon detector system in the forward direction includes magnetized iron toroids for momentum measurement. The original detector has approximately 100,000 channels of electronics read out via a FASTBUS data acqusition system. A three level trigger system selects events to be recorded on magnetic tape.

For E-741 the detector had a commissioning run in 1987, accumulating 33 nb^{-1} of integrated luminosity. In that run the Level 3 Trigger was not yet in place. The major physics run for E-741 was from June, 1988 to June, 1989 when a total of 4.69 pb^{-1} of integrated luminosity was accumulated on tape with the complete detector. The detector and data aquisition system coped well with the delivered peak luminosities of $2\times10^{30}cm^{-2}sec^{-1}$ -- a rate which was twice the design luminosity of the Tevatron Collider. Data reconstruction for this run was complete by the end of calendar 1989 and analysis of this data continues. A total of 50 papers on CDF results have been published or submitted for publication. Fifty-two graduate students have submitted theses for their degrees based on this CDF data.

E-775 is the upgraded version of CDF for Collider Runs Ia and Ib. For Collider Run Ia, CDF was rolled into the B0 Collision Hall at the end of March, 1992 and first collisions were seen in May. Studies with the Tevatron and detector continued until August 26 when CDF declared the detector commissioned and the data quality sufficient to begin the top search. A new CDF data set equal to the

1988-89 Collider Run was collected during August - December, 1992 from a delivered integrated luminosity of 6.6 pb^{-1}. Data which took 272 days to accumulate in 1988-89 took only 106 days in 1992 due to the increased Tevatron luminosity and to increased efficiency at CDF.

The new upgrades to CDF for E-775 for Collider Run I are extensive:

1. A new 1.5 inch diameter beryllium beam pipe with a 0.020 inch wall thickness was installed to replace the 2.0 inch diameter pipe used in 1989;
2. A new 4-layer, 46,000 channel Silicon microstrip Vertex Detector was installed around the beampipe to detect secondary vertices;
3. A new set of Vertex Time Projection Chambers with 4 cm drift spaces and 8,600 wires replaced the old 15 cm drift space devices;
4. New low noise preamplifiers were added to these Vertex TPCs;
5. New higher gain preamplifiers were installed on the inner layers of the Central Drift Chamber and the chamber gain was reduced to increase the lifetime of the device;
6. New amplifiers were installed on the outer layers of the Central Drift Chamber to give dE/dx information from 54 layers;
7. A vacuum leak in the solenoid cryostat was repaired;
8. 50 square meters of new wire chambers were added just behind the 1.1 radiation length thick solenoid as preradiator detectors;
9. 630 tons of steel was added to beef up the central muon detection;
10. 856 new chambers were added behind the steel walls and above/below the return yoke steel of the magnet to detect muons with rapidity less than 0.5;
11. An additional 1632 muon chambers and scintillators were added to extend the central muon coverage from rapidity of 0.5 to 1.0;
12. The forward (rapidity greater than 2.0) muon chambers and scintillators interspersed in the forward magnetic toroids were removed, refurbished with finer phi segmentation and reinstalled;
13. The gas calorimeter chamber gains were lowered to ease operation at ten times the original design luminosity;
14. 24,000 channels of new front-end electronics were installed on the gas calorimeters to compensate the gain change mentioned above, to shorten the integration times, and to reduce noise to the trigger system;
15. High voltage feedback was installed on the gas calorimeters to keep the gain stable with changing temperature and atmospheric pressure;
16. The existing multiplexed Analog to Digital Converter (ADC) cards were replaced with faster versions to reduce the front-end readout time from 18 to 3 milliseconds;
17. New luminosity monitors were installed;
18. Dual Fastbus Event Builders were installed to increase the data acquisition system rate capability by a factor of four to about 25 Hz;
19. The data acquisiton system rate capability to 8 mm magnetic tape was increased from 1.2 to 8 Hertz;

20. The Level Two trigger processors were speeded up from 40 μsec to 20 μsec processing time per event;
21. A new Neural Net Level Two trigger was installed to make possible an isolation requirement on photon and electron triggers;
22. The computing power in the Level Three trigger farm was increased by a factor of 25 using UNIX based processors;
23. The offline code (and identical Level Three trigger code) was ported to UNIX;
24. 1000 Mips of offline computing was installed in offline farms; and
25. A robotic tape silo with 1.2 Terabytes of storage was installed for fast access to the data.

During the 1992 Collider Run Ia, the E-775 detector has functioned well. Only 2% of the 46,000 Silicon detector channels are not working and the device is surviving the Tevatron Collider radiation thanks to close and fruitful interaction between CDF and the Accelerator Division. Less than 1% of the channels in the rest of the detector have problems. The operational uptime of the detector is about 80% (still short of the collaboration's goal of 90%). The trigger plus readout live time is 90% at luminosities of 5×10^{30} as planned. The W and Z production rates in the older detector systems are comparable to 1989, and additional Ws and Zs are seen in the newly upgraded muon systems and in the gas calorimeters with rapidity >1.0. Detector thresholds have been lowered to give nearly five times the rate of $J/\psi \rightarrow \mu^+\mu^-$ detected per pb^{-1} of luminosity recorded. Secondary vertices have been seen with the new silicon detector and it is clear the device will allow a measurement of the b-quark lifetime.

Collider Run I is still in progress and analysis of this new data has just begun. Five papers on the upgraded detector and new data were presented at DPF92, and 26 papers on the new data have been submitted to the April, 1993 Washington APS Meeting.

E-830 is the upgraded version of CDF for Collider Run II, where the spacing between Tevatron bunches will decrease from 3500 nsec to 400 sec and luminosities greater than $10^{31}cm^{-2}sec^{-1}$ are expected. The goal of this upgrade project is to improve the detector to enable it to operate at a luminosity of $5\times10^{31}cm^{-2}sec^{-1}$ with a Tevatron bunch spacing as small as 132 nsec. The major components of the E-830 CDF upgrade are:

a) Replace the plug and forward gas calorimeters with a new scintillator-based calorimeter enabling the forward muon toroids to be moved closer to the interaction region;
b) Upgrade the front-end electronics and trigger systems to accommodate data-taking at higher rates with shorter Tevatron bunch spacings;
c) Upgrade the data acqusition system to increase throughput and reliability;
d) Replace the silicon vertex detector with a device capable of withstanding higher radiation and with a readout system matched to 132 nsec spacing; and
e) Enhance the off-line computing capability to provide for efficient production of physics results as the quantity of data increases.

The CDF Collaboration has increased dramatically in size since 1989. Sixteen new universities and national laboratories have joined to double the number of collaborating institutions to 33. A total of 401 physicists are now members, up from 187 in 1989. Of these 401, 126 are graduate students, 78 hold post-doctoral positions, and 197 are permanent staff.

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Theses

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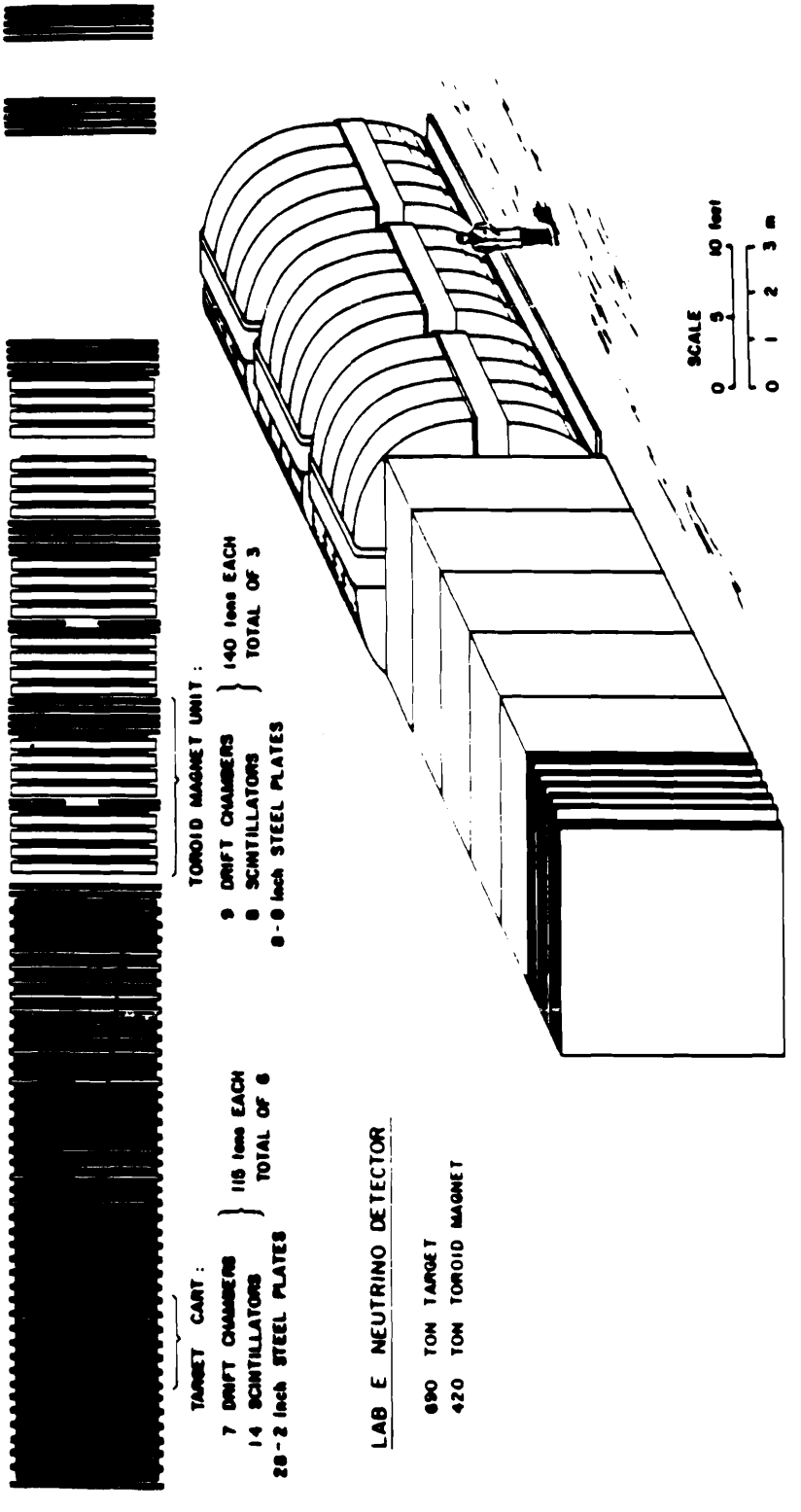
E-744/770



LAB E NEUTRINO DETECTOR

690 TON TARGET
420 TON TOROID MAGNET

E-744 / 770 (Merritt / Smith) Neutrino Physics at the Tevatron

Chicago, Columbia, Fermilab, Rochester, Wisconsin

Status: *Data Analysis*

The apparatus consists of a 690 ton iron target instrumented as a calorimeter with high density tracking, and a toroid system for momentum measurement of the muon.

Two quadrupole triplet neutrino runs, in 1985 (E-744) and 1987-88 (E-770), accumulated a total of approximately 3.6 million charged current events and 1.1 million neutral current events.

Recent Results

1. Measurements of nucleon structure functions, F_2 and xF_3 from the high-statistics, high-energy neutrino-iron scattering experiment at the Fermilab Tevatron. The existing high-statistics xF_3 determination by the CDHSW collaboration is compared to our data. The data presented constitute the first corroboration of the QCD prediction of xF_3 evolution at low-x, and yields a preliminary value of lambda = 210 ± 28 ± 41 MeV, and a determination of the GLS sum rule at Q^2 = 3 GeV^2, S_{gls} = integral of (1/x) xF_3 (x) dx = 2.50 ± 0.018 (stat.) ± 0.078 (syst.). Our value of lambda yields a strong coupling constant, $\alpha(Mz)$ = .111 ± .002 ± .003 ± .003 (scale). Comparison of the neutrino determination of F_2 (x, Q^2) with that obtained from charged-lepton (e or μ) scattering leads to a precise test of the mean-square charge prediction by the Quark Parton Model. The SLAC-CCFR and BCDMS structure functions provide a consistent and precise set of structure functions over a large range of Q^2.

2. Measurements of the rate of neutrino- and antineutrino-induced prompt same-sign dimuon production in steel using a sample of 220 $\mu^-\mu^-$ events and 15 $\mu^+\mu^+$ events with Pμ > 9 GeV/c, and energies between 30 GeV and 600 GeV. After background subtraction, the prompt rate of same-sign dimuon production is $(0.53 \pm 0.24) \times 10^{-4}$ per neutrino charged-current events and $(0.52 \pm 0.33) \times 10^{-4}$ per antineutrino charged-current event.

3. Measurements of opposite sign dimuons with $P\mu_1$ > 9 GeV/c, $P\mu_2$ > 5 GeV/c (for E_{had} < 130 GeV, $P\mu_2$ > 9 GeV otherwise) and 30 < E < 600 GeV yielded a sample of 5044 neutrino and 1052 antineutrino induced opposite sign dimuon events. The data support the slow rescaling model of charm production with a value of the charm quark mass of 1.31 ± .24 GeV/c^2. The CKM matrix element $|V_{cd}|$ = 0.209 ± 0.012 and the nucleon strangeness content, η_s = $0.64\ ^{+0.0075}_{-0.0065}$ are measured with the strange sea x distribtuion found to be softer than its non-strange counterpart. We also have the first measurements of the Q^2 dependence of the strange quark densities, xs(x).

4. A preliminary determination of the weak mixing angle from a sample of 5×10^5 events with a mean neutrino energy of 166 GeV. Our result, $\sin^2\theta_W = 0.2242 \pm 0.0044$ (expt.) $\pm$ 0.0047 (model), is the highest energy high statistics determination of the weak mixing angle using neutrino data.

5. A measurement of inverse muon decay of (.131 $\pm$ .015)% with respect to charged current events in the energy range 30-600 GeV.

6. Hadron shower punchthrough and muon production by hadrons of 40, 70 and 100 GeV.

7. $\sigma_{\bar{\nu}}/\sigma_\nu$: .511 $\pm$.002 (stat.) $\pm$.005 (syst) up to E_ν = 600 GeV.

8. We exclude a NHL in the $\nu_\mu + N \rightarrow \mu^- + x$ channel with mass between 0.5 and 2.5 GeV/c^2 for coupling to muons below 10^{-4} of Fermi strength, depending on the lepton mass.

9. The observed number of neutrino tridents, muon pairs produced by neutrino scattering in the Coulomb field of a target nucleus, 37.0 $\pm$ 12.4, supports the Standard Model W-Z destructive interference prediction of 45.3 $\pm$ 2.3 events, ruling out, at the 99% CL, the V-A prediction without the interference.

10. The relative absence of $\bar{\nu}_\mu$-induced charged current events with respect to ν_μ-induced events at large x (> 0.45) and large y (> 0.70) limits the right-handed coupling of the weak current: $|\eta|^2 = |g_R/g_L|^2 < 0.0015$ with 90% CL.

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A Precision Measurement of the Gross-Llewellyn Smith Sum Rule in ν_μ-N scattering at the Fermilab Tevatron, W. C. Leung et al., presented at 25th Rencontres de Moriond, January, 1990.

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A Study of Double Vertex Events in Neutrino Nucleon Interactions, H. S. Budd et al., in Proceedings of Beyond the Standard Model III, Carleton University, Ottawa, Canada, June, 1992.

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Neutrino Production of Dimuons at the Fermilab Tevatron, M. H. Shaevitz et al., in Proceedings of the International Conference on High Energy Physics, Dallas, Texas, August, 1992.

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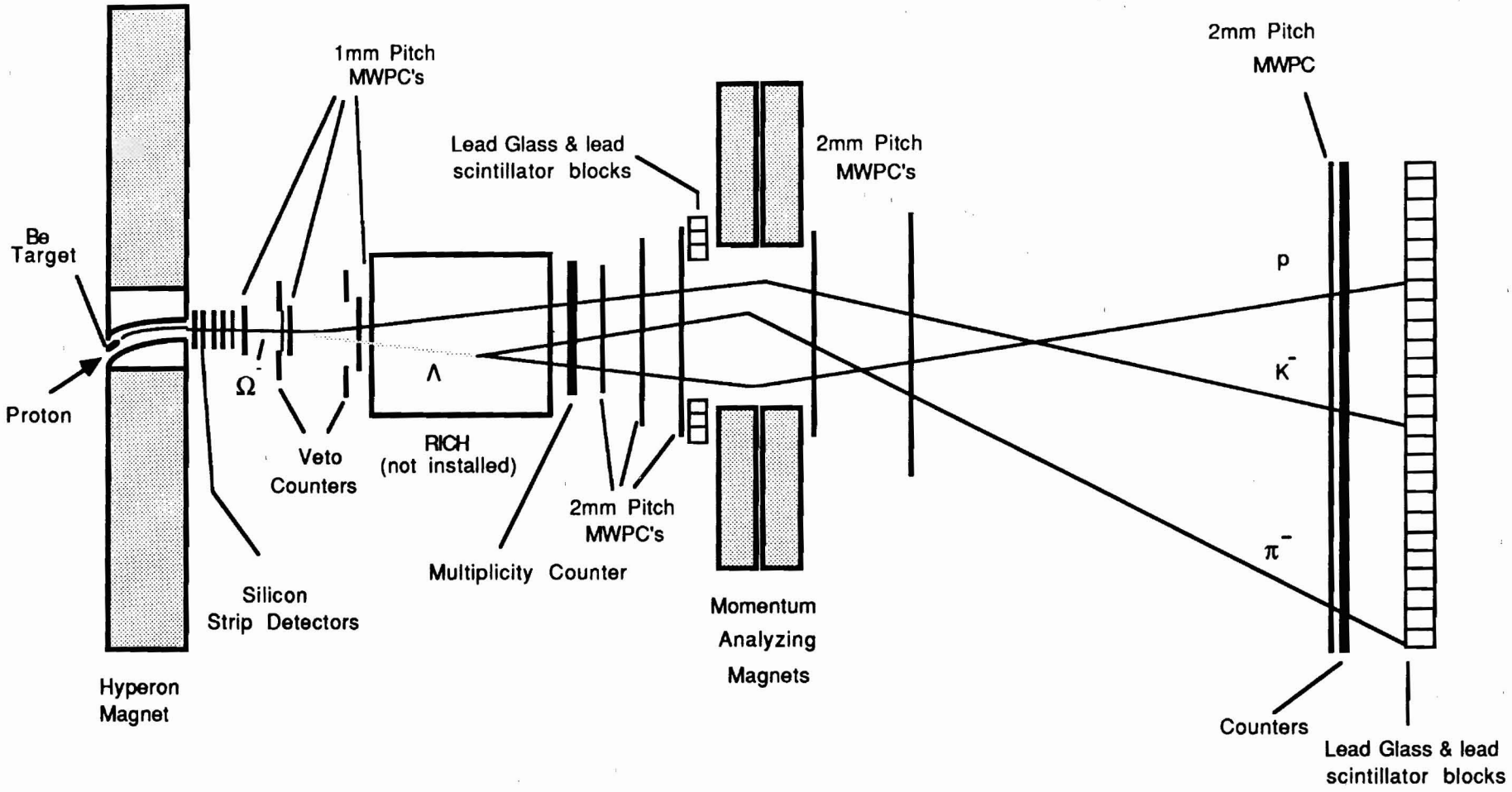
B.A. Schumm, U. Chicago, Like Sign Dimuons, 1988.
K. Bachmann, Columbia U., Like Sign Dimuons, 1988.
C. Foudas, Columbia U., Opposite Sign Dimuons, 1989.
W. Leung, Columbia U., Structure Functions, 1991.
P. Quintas, Columbia U., Structure Functions, 1991.
P. deBarbaro, U. Rochester, Search for Neutral Heavy Leptons, 1991.
P. Sandler, U. Wisconsin, Hadron Punchthrough, Dimuons, 1992.
S. Rabinowitz, Columbia U., Opposite Sign Dimuons, exp. 1992.
W. Lefmann, Columbia U., Rare Phenomena, exp. 1993.
W. Seligman, Columbia U., Structure Functions, exp. 1993.
B. King, Columbia U., Measurement of $Sin^2\theta_W$, exp. 1993.
C. Arroyo, Columbia U., Measurement of $Sin^2\theta_W$, exp. 1993.
T. Kinnel, U. Wisconsin., Measurement of Primordial P_T, exp. 1993.



Plan View of E756 Spectrometer (not to scale)

E-756 (Luk) Magnetic Moment of the Omega Hyperon

Fermilab, Michigan, Minnesota, Rutgers, Washington

Status: *Data Analysis*

Baryon magnetic moments play an important role in probing the structure of hadrons. Fermilab experiments have contributed significantly in determining the magnetic moments of the hyperons. At Fermilab energies, hyperons are copiously produced and typically have a mean decay distance of several meters in the laboratory. The magnetic moments of these hyperons are measured by means of spin precession.

The omega minus hyperon, Ω^-, is a unique hadron made up of three strange quarks with parallel spin. In the broken SU(6) quark model, the lambda hyperon magnetic moment is just the strange quark magnetic moment whereas the omega minus magnetic moment, μ_{Ω^-} is three times larger, or −1.83 nuclear magnetons (n.m.). However, corrections used in refined theoretical models can destroy the equality between the lambda and the strange quark magnetic moments. Consequently, μ_{Ω^-} may well be the most direct measurement of the strange quark magnetic moment. Prior to E-756, μ_{Ω^-} was not known experimentally.

E-756 was carried out in the Proton Center beamline. The plan view of the spectrometer is shown in the figure. After the negatively charged beam was produced either by protons or a neutral hyperon beam, it was then momentum-selected by a 7.3 m-long sweeping magnet, M1, with a curved channel inside. M1 was also employed to precess the spin of the hyperons if they were polarized. The field integral of the magnet could be set to a value between 0 and 26 T-m. After exiting from the magnetic channel, the decay products of the hyperons were detected by a spectrometer which was 67 m long and 1.3 m wide. The spectrometer consisted of eight planes of silicon strip detectors, three 1 mm wire spacing multiwire proportional chambers and six 2 mm pitch MWPC's and scintillation counters used for triggering purposes. Photons from the decays were detected by two electromagnetic calorimeters made up of lead glass and lead-scintillator blocks. The momentum analyzing magnet, M2, had a transverse kick of 1.5 GeV/c. The magnetic fields of M1 and M2 were reversed when positively charged hyperons were studied. A mass resolution of 3 MeV/c^2 was achieved at the mass of Ω^-.

Data-taking was completed in the 1987-1988 fixed-target run. We have collected approximately 100,000 Ω^-'s, 6 million Ξ^-'s, 2,000 $\bar{\Omega}^+$'s and 70,000 $\bar{\Xi}^+$'s produced by 800 GeV protons on a beryllium target. Another sample of 25,000 polarized Ω^-'s and 1.5 million Ξ^-'s created by a polarized neutral beam incident on a copper target at 0 mrad was also collected.

We discovered the $\bar{\Xi}^+$'s produced by protons were polarized, with a signal of $-0.097 \pm 0.012 \pm 0.009$ at a mean x_F of 0.39 and p_t of 0.76 GeV/c. This is comparable to that of the Ξ^-. The magnetic moment of the $\bar{\Xi}^+$ was measured for

the first time and was found to be $0.657 \pm 0.028 \pm 0.020$ n.m.

The kinematic dependence of the Ξ^- polarization in proton induced reactions was studied. It was found to be independent of x_F, a different behavior than that of the lambda hyperon. We also observed for the first time that the Ξ^- polarization depends on the center of mass energy. The magnetic moment of the Ξ^- has now been measured to be -0.6505 ± 0.0025 n.m., the third best known baryon magnetic moment.

In contrast to the $\bar{\Xi}^+$, the Ω^-'s produced by protons were found unpolarized. However, they were polarized when they were created by the polarized neutral beam. This was the highest energy spin transfer measurement ever performed. With this polarized sample, we have measured the magnetic moment of the Ω^- to be $-1.94 \pm 0.17 \pm 0.14$ n.m.

We would like to measure the production cross sections of the charged strange particles in 800 GeV proton-beryllium collisions. In addition, we plan to search for rare hyperon decays and are in the process of analyzing the properties of the $\bar{\Omega}^+$.

Publications

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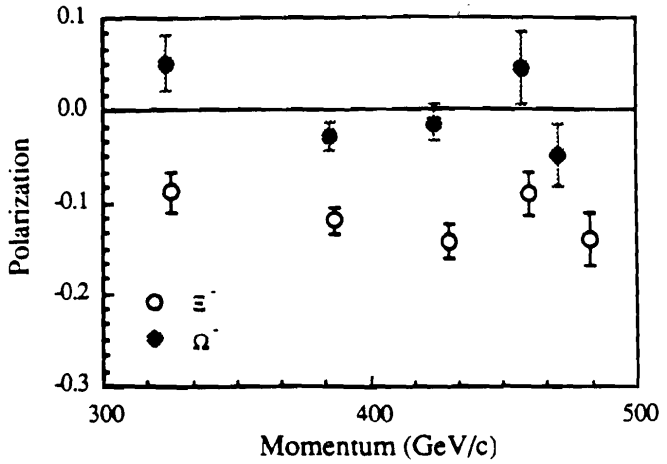


Figure 1. Polarization of Ξ^- and Ω^- produced by protons.

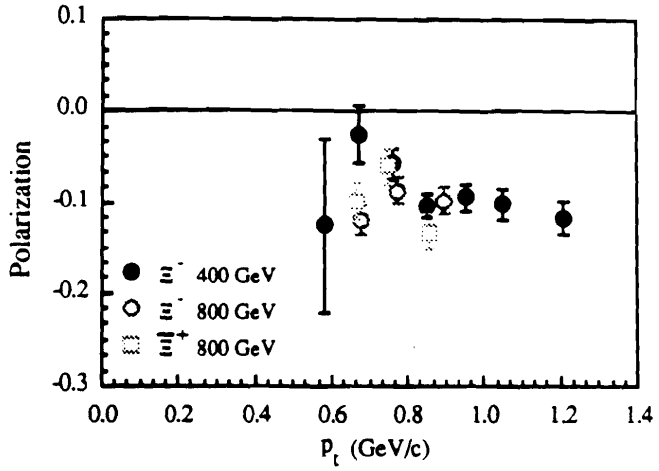


Figure 2. Polarization of Ξ^- and $\bar{\Xi}^+$ produced by protons.

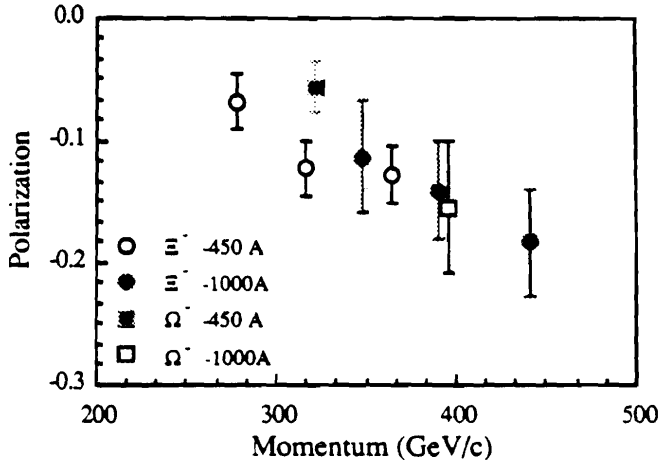
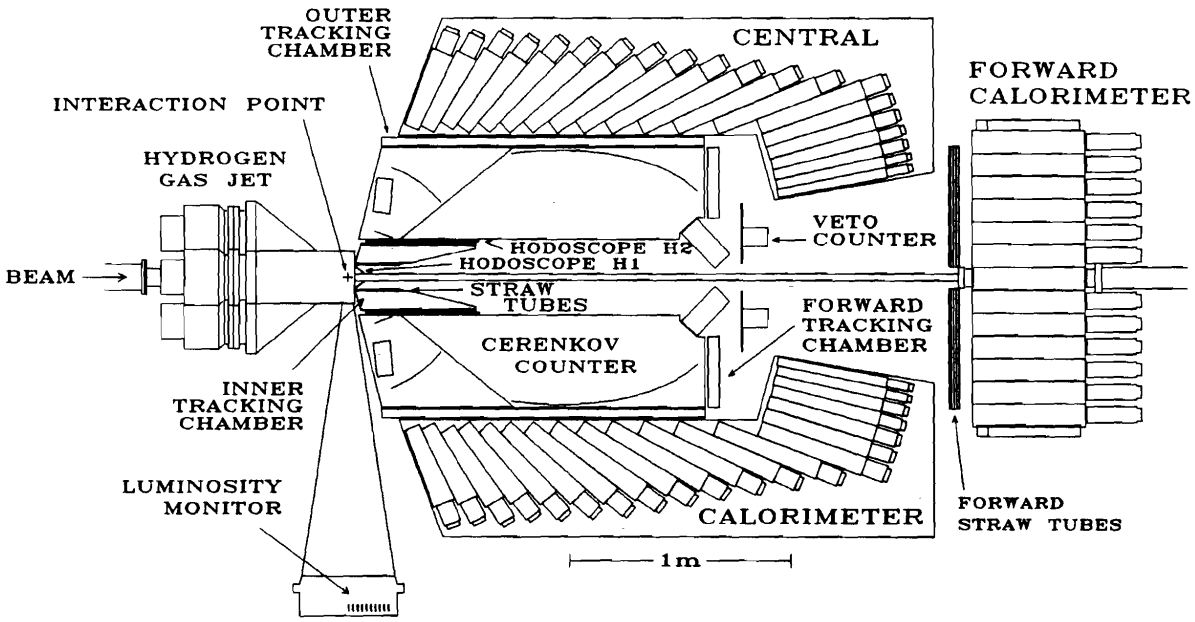


Figure 3. Polarization of Ξ^- and Ω^- produced by polarized neutral hyperons.

E-760


OUTER
TRACKING
CHAMBER
CENTRAL
FORWARD
CALORIMETER
INTERACTION POINT
HYDROGEN
GAS JET
VETO
COUNTER
HODOSCOPE H2
HODOSCOPE H1
BEAM
STRAW
TUBES
FORWARD
TRACKING
CHAMBER
CERENKOV
COUNTER
INNER
TRACKING
CHAMBER
LUMINOSITY
MONITOR
CALORIMETER
FORWARD
STRAW TUBES
1m

E-760 / E-835 (Cester) Investigation of the Formation of Charmonium States Using the Antiproton Accumulator Ring

UC/Irvine, Fermilab, INFN & University of Ferrara (Italy), INFN & University of Genova (Italy), Northwestern, Pennsylvania State, INFN & University of Torino (Italy)

Status: *E-760 - Data Analysis*
E-835 - No Data Yet

Experiment E-760 studies charmonium states formed in $\bar{p}p$ collisions. A cooled antiproton beam of up to 4×10^{11} $\bar{p}$'s circulating in the Fermilab Antiproton Accumulator ring intercepts a high density hydrogen jet. States can be formed directly in $\bar{p}p$ interactions which are not directly accessible in e^+e^- interactions. The antiproton beam is cooled to $\Delta p/p = 2\times10^{-4}$ which allows sub-MeV widths of charmonium states to be measured directly for the first time.

The apparatus is optimized to detect charmonium states in the presence of the hadronic background through their decays to final states containing electrons and/or photons (e.g. $p\bar{p} \rightarrow \chi \rightarrow J/\psi\,\gamma \rightarrow e^+e^-\gamma$, $p\bar{p} \rightarrow \eta_c \rightarrow \gamma\gamma$). The main element of the detector is the central electromagnetic calorimeter, which consists of a cylindrical array of 1280 lead glass cerenkov counters. This is augmented in the forward direction by a planar electromagnetic calorimeter. Inside the central calorimeter are two scintillator hodoscopes, tracking chambers and a 16-cell threshold Cerenkov counter for electron identification.

E-760 took its first data with the complete apparatus in 1990. Energy scans performed at the J/ψ and ψ' found remarkably clean signals and demonstrated the capability of the detector and the antiproton source; precision measurements of the χ_1 and χ_2 line parameters have been published. The experiment took 31 pb^{-1} of data in 1991, concentrating on measuring the $\gamma\gamma$ decay rate of the χ_2 state, a search for the η_c', and measuring the η_c width. The line widths of both the J/ψ and the ψ' were also measured and a rich field of light-quark resonances which decay to neutrals is under study. The major achievement of the second run, however, was the discovery of the $^1P_1$ state: this was found as a result of an energy scan around the center of mass of the χ states in the mode $\bar{p}p \rightarrow {}^1P_1 \rightarrow J/\psi\,\pi^0 \rightarrow e^+e^-\gamma\gamma$.

Topics under analysis are:

(a) Mass and width of η_c (direct measurement);

(b) Where is the η_c'?;

(c) $\bar{p}p$ to $\pi^0\pi^0$ (exclusive cross section as a function of energy); and

(d) $\bar{p}p$ to $\pi^0\gamma$ (a major background and interesting in its own right).

Another topic on which we have data is light quark spectroscopy. The resolution and high granularity of the central electromagnetic calorimeter allow us to see clean signals in multi-photon events and we have good evidence for new $\pi^0\pi^0$ and $\eta\eta$ resonances which we reported at Le Courmayeur in 1992. We expect to produce papers on these data in the next six months.

For our next run (E-835), the following will be our highest priority measurements:

a) determination of mass and total width of the η_c and of the product of the branching fractions $B(\eta_c \rightarrow \bar{p}p) \times B(\eta_c \rightarrow \gamma\gamma)$;

b) confirmation of the $^1P_1$ signal and a more precise determination of the $^1P_1$ parameters;

c) Search for the η_c' and determination of its mass and width;

d) determination of the mass and total width of the χ_0 and of the products of the branching fractions $B(\chi_0 \rightarrow \bar{p}p) \times B(\chi_0 \rightarrow \gamma\gamma)$ and of $B(\chi_0 \rightarrow \bar{p}p) \times B(\chi_0 \rightarrow J/\psi + \gamma)$.

Other measurements will be of the angular distributions in radiative decays of the χ_1 and χ_2, a search for the missing D-states of charmonium, and others unrelated to charmonium physics which can be done concurrently with the measurements on charmonium physics.

The program outlined will not be completed in the next fixed-target run unless we substantially increase the instantaneous luminosity of the experiment. This will be possible with the expected increase in stacking rate of the Antiproton Source and with an upgrade of the hydrogen gas-jet target system. In addition, there are several detector upgrades needed to cope with the increased instantaneous rates.

Publications

Precision Measurements of Charmonium States Formed in $\bar{p}p$ Annihilation, Phys. Rev. Lett. 68, 1468 (1992).

Study of the χ_1 and χ_2 Charmonium States Formed in $\bar{p}p$ Annihilations, Nucl. Phys. B373, 35 (1992).

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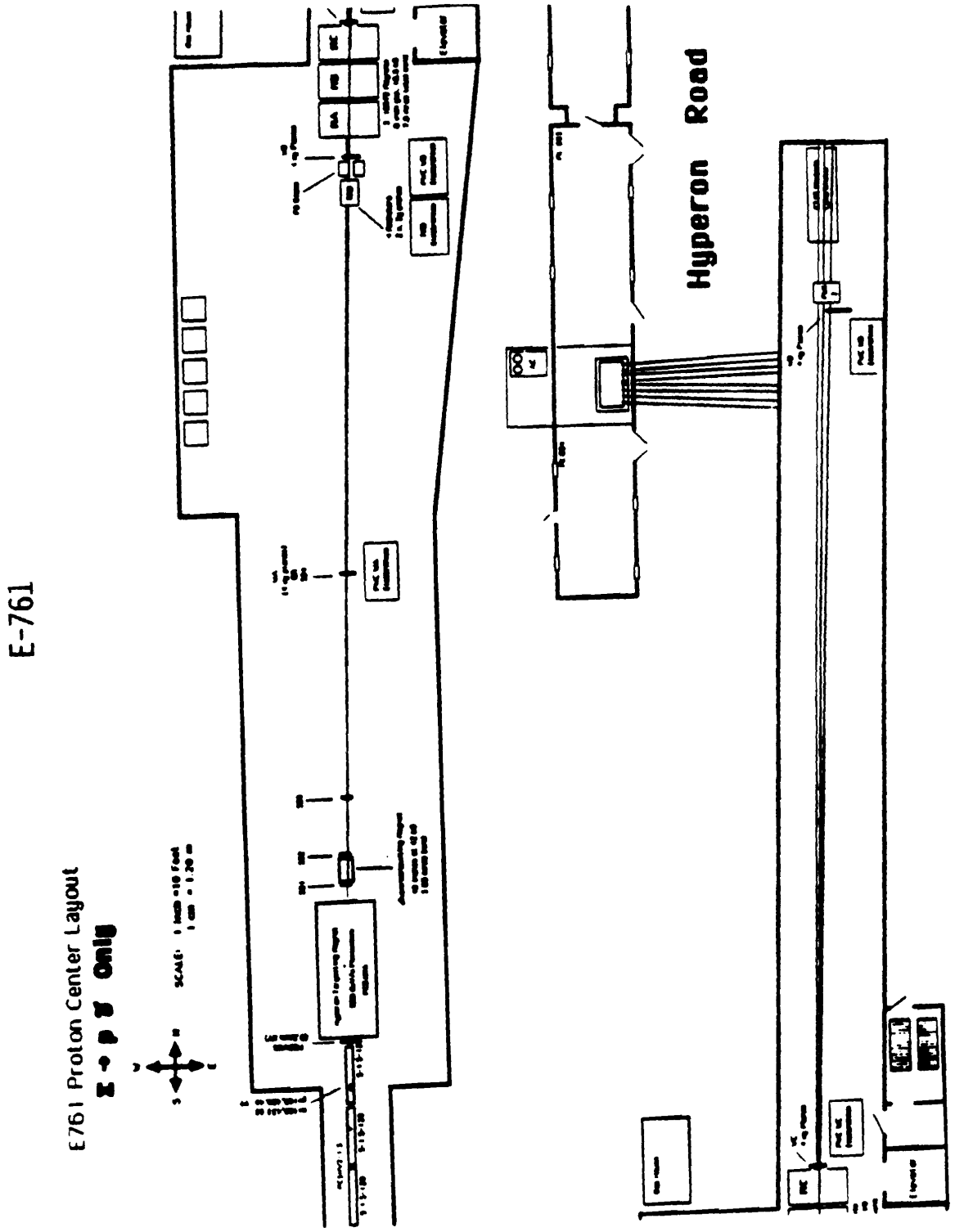

E-761
E761 Proton Center Layout
Hyperon Road

E-761 (Vorobyov) An Electroweak Enigma: Hyperon Radiative Decays

Bristol (Great Britain), CBPF (Brazil), Fermilab, IHEP/Beijing (PRC), Iowa, ITEP/Moscow (Russia), PNPI (Russia), Rio de Janeiro (Brazil), Sao Paulo (Brazil), Yale

Status: *Data Analysis*

This experiment will probe the structure of the electroweak interaction and has two main goals. The first is to measure the asymmetry parameter for the electroweak decay $\Sigma^+ \rightarrow p\gamma$ and verify its branching ratio. The second goal will be to measure, or set new upper limits for, the branching ratio of the electroweak decay $\Xi^- \rightarrow \Sigma^-\gamma$. Since the Ξ^- are expected to be polarized, information on the asymmetry parameter may also be available.

We will use the Proton Center polarized charged hyperon beam and a new very high resolution spectrometer. The same channel as used for E-715 will allow us to utilize secondary momenta hyperons of up to 350 GeV/c. However to get the needed excellent momentum resolution of the hyperon beam, we will require a primary proton beam of very small size so that a target of 0.5 mm width in the bend plane can be used. This small target size combined with silicon strip detectors to determine the hyperon trajectory should allow a determination of the hyperon momentum to ≈0.15%. The momentum vector of the decay baryon (p from $\Sigma^+ \rightarrow p\gamma$ or ~Σ^- from $\Xi^- \rightarrow \Sigma^-\gamma$) will be determined by a proportional chamber spectrometer consisting of three BM109 magnets. The spectrometer high resolution will allow us to distinguish the single photon decay mode from the much more copious competing π^0 decay mode. For the decay $\Xi^- \rightarrow \Sigma^-\gamma$, the lever arms of the decay spectrometer will be shortened from what is shown in the diagram to allow a measurement of the Ξ^- direction before it decays.

The position of the γ will be measured to about 1.0 mm by first converting them and then using a transition radiation detector (TRD) to measure the direction of the fast forward electrons. Following the TRD a lead glass array will measure the total electromagnetic energy. Thus the full momentum vector will be measured for the incident hyperon and all of the radiative decay products providing excellent kinematic identification.

About 220M positive beam triggers and 300M negative beam triggers were recorded in the 1990 fixed-target run.

Figure 1. Summary of the E-761 positive beam data set. The plot shows the missing mass squared of the neutral recoil assuming the incident hyperon was a Σ^+ and the charged daughter was a proton. Only charged track information is used at this stage. There are 48M $\Sigma^+ \rightarrow p\pi^0$ decays and 67K $\Sigma^+ \rightarrow p\gamma$ decays visible on this plot along with a small $K^+ \rightarrow \pi^+\pi^0$ background.

Figure 2. A few days of negative beam data with the same apparatus configuration as for the Figure 1 data yielded 250K anti(Σ^+) $\rightarrow \bar{p}\pi^0$ decays and

about 400 anti $(\Sigma^+) \rightarrow \bar{p}\gamma$ decays. These data allow us to measure the radiative branching ratio and magnetic moment of the anti(Σ^+).

Figure 3. The $\Sigma^+ \rightarrow p\gamma$ signal is extracted by using the E-761 photon detectors to separate events with one and two final state photons. Figure 3a shows a scatter plot of the missing neutral mass squared in the region of the photon versus a χ^2 for the hypothesis that the pattern of hits in the TRD system is consistent with one photon. The normalized projections for signal ($\chi^2 < 1$) and background ($\chi^2 > 4$) are shown in Figure 3b.

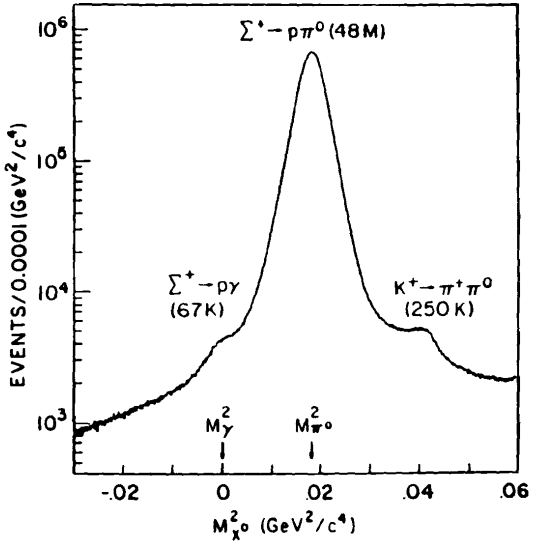
Figure 4. The data were taken in equal sub-samples with the Σ^+ polarization up and down. The magnitude of the polarization is ~12%. This allows us to extract the asymmetry parameter in the radiative decay. This result is shown along with previous low statistics measurements. It was recently published in PRL.

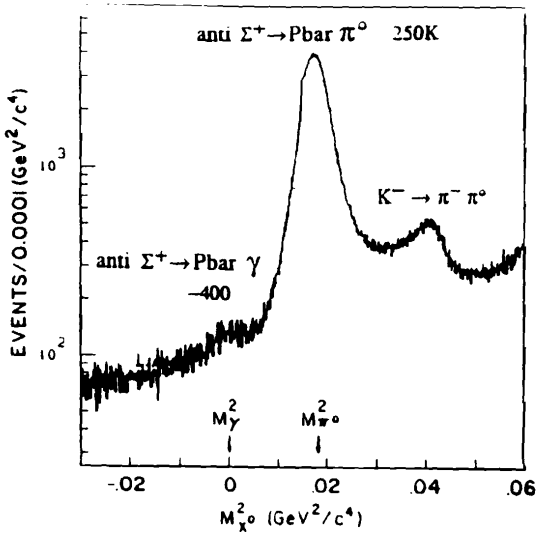
Figure 5. In an auxiliary measurement we added a pair of bent silicon crystals. Hyperons were channeled in these crystals and bent through angles of ± 1.6 mrad. We observed for the first time the precession of the Σ^+ polarization in the 45T effective magnetic field of the bent crystal. The precession angle of ~60 degrees allows a measurement of the magnetic moment of the Σ^+ in a longitudinal distance of 45 mm. This new technique may prove useful in measuring the magnetic moment of very short lived states such as the charmed baryons. This result has been submitted to PRL.

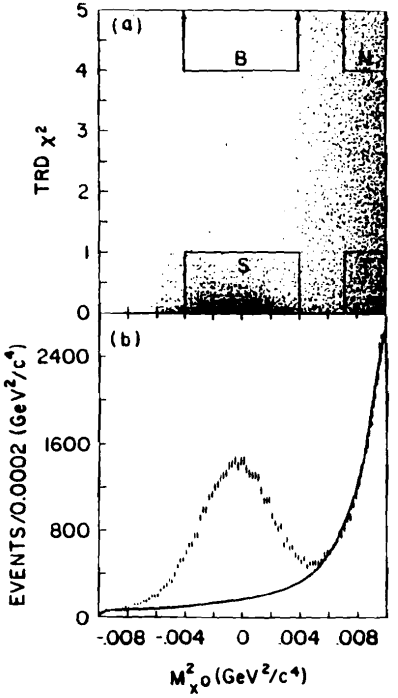
Figure 6. A signal for $\Xi^- \rightarrow \Sigma^-\gamma$ has been extracted. The same techniques are used as in the analysis of the positive beam data. This represents >10 times the previous world sample. An analysis for the branching ratio ($\sim 10^{-4}$) of this decay mode is in progress. The sample is still too small to measure the asymmetry parameter in this mode. A determination of the sign of the asymmetry may be barely possible.

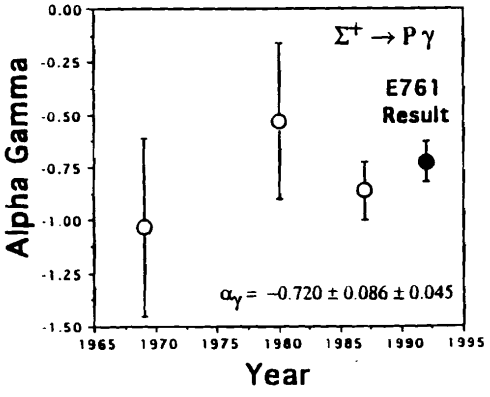
Table 1. A summary of journal publications and theses to date are given. Four more students continue to work on analyses and several more papers are in draft or are expected.

E761 - Radiative Hyperon Decays

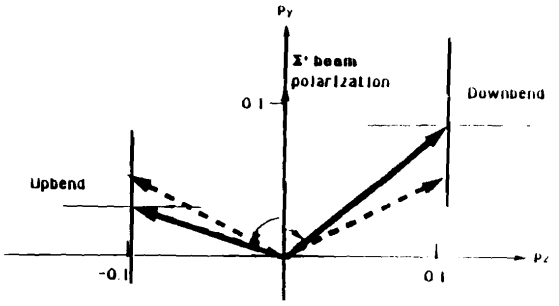




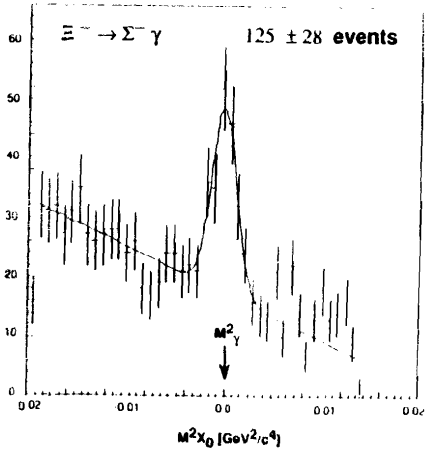




Foucher, et.al., Phys.Rev. Lett. 68:3004,1992



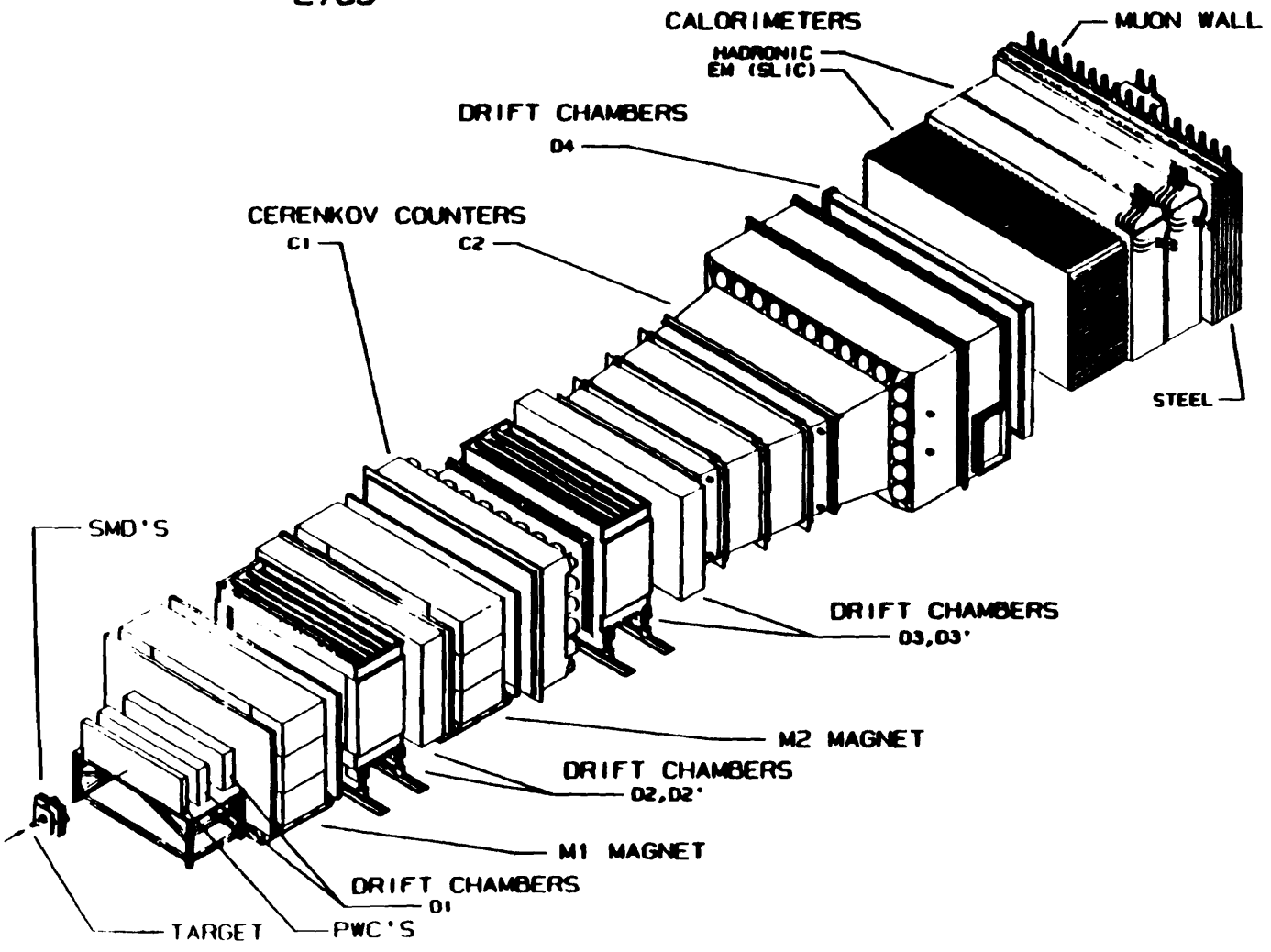
First Observation of Magnetic Moment Precession of Channeled Particle (Σ^+ Hyperons) in Bent Crystals (D. Chen, et.al., Submited to Phys.Rev.Lett.)



Publications

$\alpha_\gamma(\Sigma^+ \to P\gamma)$	Phys.Rev.Lett. 68:3004,1992. Ph.D. Thesis Maurice Foucher (Yale University)
Channeling	Submitted to Phys.Rev.Lett Ph.D. Thesis Dong Chen (SUNY, Albany)
Σ^+, anti(Σ^+) Polarization and Magnetic Moments	Ph.D. Thesis Antonio Morelos (CINVESTAV, Mexico)

TAGGED PHOTON SPECTROMETER
E769



E-769 (Appel) Pion and Kaon Production of Charm and Charm-Strange States

CBPF (Brazil), Fermilab, Mississippi, Northeastern, Toronto (Canada), Tufts, Wisconsin, Yale

Status: *Data Analysis*

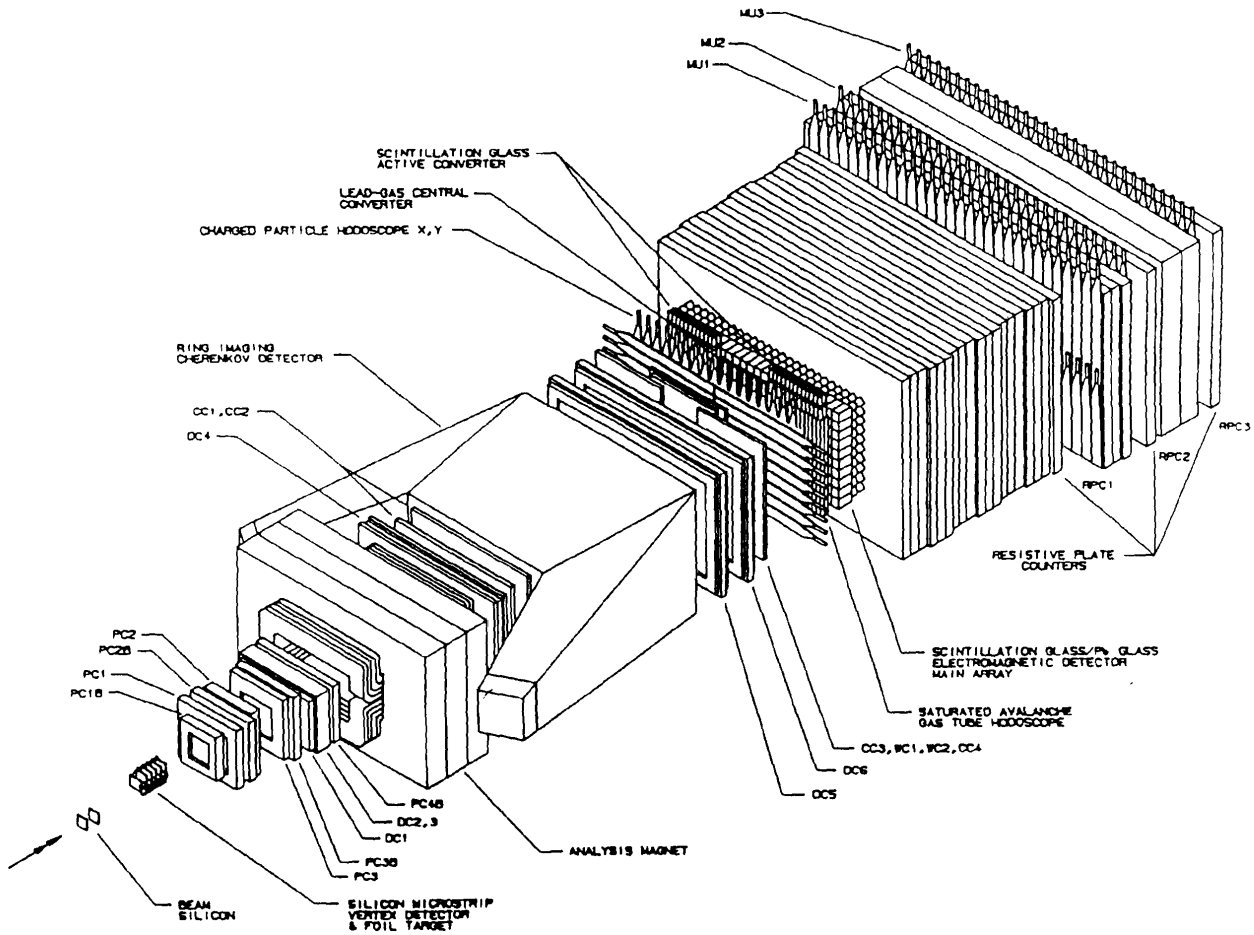
E-769 is an experiment to measure the properties of hadronic charm production using the Tagged Photon Spectrometer facility. It measures the flavor, x, p_t and A dependences of this process at the same time and in a single apparatus.

The experiment collected its data during the 1987-88 fixed-target running period, recording interactions of 250 GeV beams of identified pions, kaons and protons. The beam was incident on a foil target assembly with four materials: beryllium, aluminum, copper and tungsten, segmented in the beam direction. The total data set consists of about 400 million triggers with about 200 million each of negative beam events (85% pi, 15% kaon) and positive beam events (40% pi, 30% kaon and 30% proton).

The Tagged Photon Spectrometer is a large-acceptance, high-resolution magnetic spectrometer. It is equipped with electromagnetic and hadronic calorimetry, Cerenkov particle identification and silicon microstrip detectors (SMD's) for vertex reconstruction. The spectrometer is augmented by a beam DISC Cerenkov counter, a new beam transition radiation detector (TRD) and new planes of beam defining SMD's and PWC's.

Final results based on the full data sample are beginning to appear in refereed journals. Many conference proceedings have been published over the last three years with earlier, preliminary results. These, in turn, have sparked theoretical interest in the underlying hard production process and hadronization and nuclear effects. Eight Ph.D. theses based on data from E-769 have been accepted. A total of fifteen Ph.D. students are expected to obtain theses based on the data from this experiment.

High Intensity Lab Spectrometer
E771



E-771 (Cox) Beauty Production by Protons

Athens (Greece), Brown, UC/Berkeley, UCLA, Dubna (Russia), Duke, Fermilab, Houston, Lecce (Italy), MIT, McGill (Canada), Nanjing (PRC), Northwestern, Pavia (Italy), Pennsylvania, Prairie View A&M, Shandong (PRC), South Alabama, SSCL, Vanier (Canada), Virginia

Status: *Data Analysis*

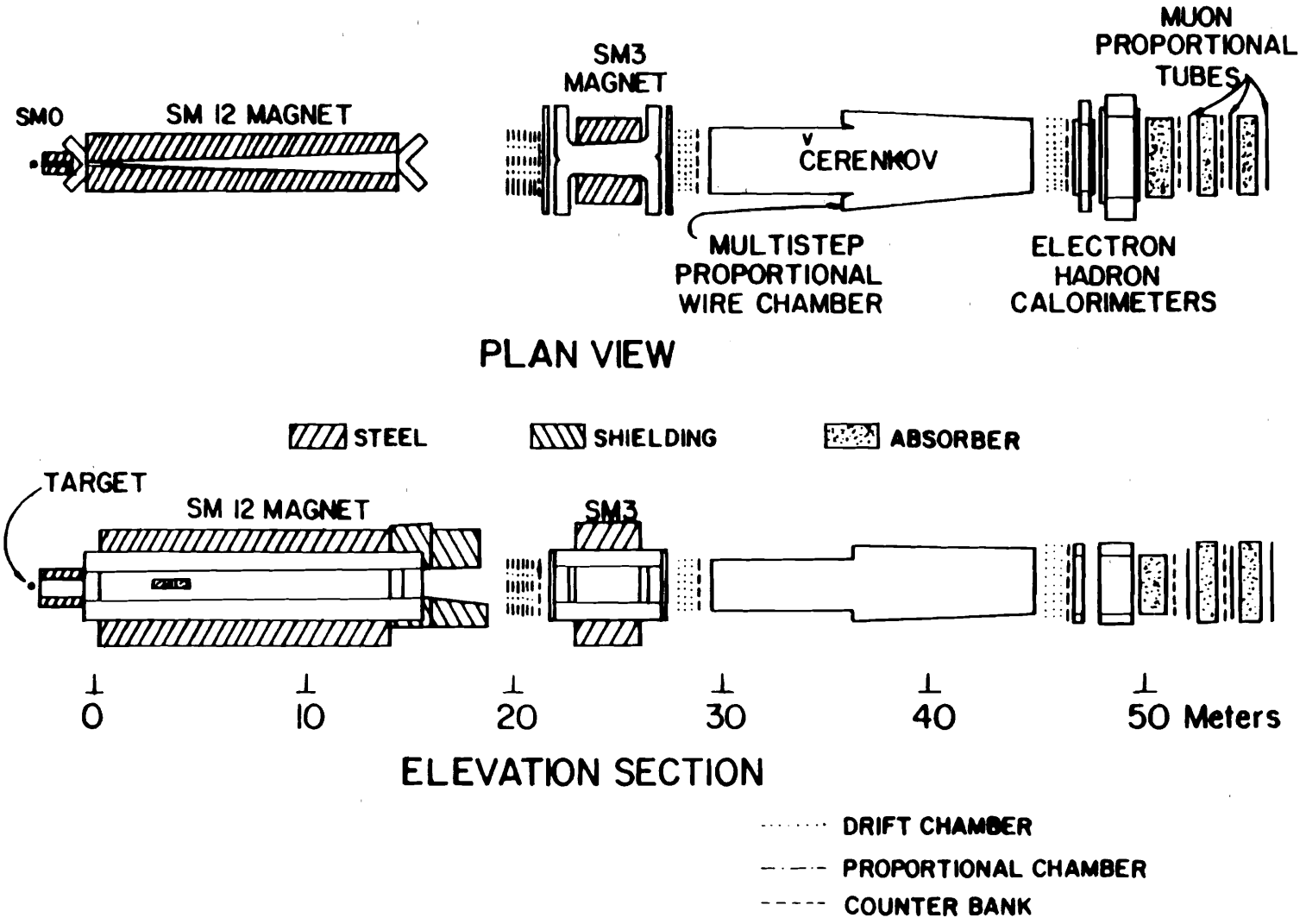
The presence of muons in final states produced in hadronic interactions has proved to be a valuable indicator that interesting hard physics processes have taken place. Experiment E-771 will use both high P_t single muons and high-mass muon pairs as a signature that events are possible beauty production candidates. These muons provide a mechanism for selecting the relatively rare beauty production from interactions due to the total cross section. We will use the high rate E-705 spectrometer which has already functioned well in Experiments E-537 and E-705 to detect and measure beauty hadron decays which result in a final state containing either type of muon signature. This experiment will use the primary proton beam from the Tevatron at the maximum energy available at the time of execution of the experiment. The spectrometer is being augmented by the addition of a silicon tracker for the first run. For later runs, a RICH (Ring Imaging Cerenkov) will be added. The present P-West High Intensity Laboratory secondary beam has been upgraded by addition of sufficient bending power to allow the transport of the 800 to 925 GeV/c primary proton beam to the experiment target. The eventual aim of the experiment is operation at greater than 10^7 interactions per second, allowing the accumulation of several thousand reconstructed or partially reconstructed B decays.

The reactions to be studied are the following:

$$A. \quad pW \rightarrow \overline{B}B + X$$
$$B \text{ or } \overline{B} \rightarrow \Psi + \text{anything}$$
$$\rightarrow \mu^+\mu^-$$

$$B. \quad pW \rightarrow \overline{B}^{\circ}B^{\circ} + X$$
$$\rightarrow \text{anything}$$
$$\rightarrow \mu^- + \overline{\nu} + \text{anything}$$

E-771 took a major step forward during the 1991 run of the Fermilab fixed-target program. While only a limited time was available after installation of all electronic channels, the experimenters have taken over 100 million dimuon triggers and several 10's of millions of single muon triggers. The silicon detector was functional during this running and the majority of the triggers operated nominally. This data set should allow complete understanding of the apparatus for the 1994 fixed-target run and has the potential for extraction of B physics results.


SM0
SM 12 MAGNET
SM3
MAGNET
CERENKOV
MUON
PROPORTIONAL
TUBES
MULTISTEP
PROPORTIONAL
WIRE CHAMBER
ELECTRON
HADRON
CALORIMETERS
PLAN VIEW
STEEL
SHIELDING
ABSORBER
TARGET
SM 12 MAGNET
SM3
0
10
20
30
40
50 Meters
ELEVATION SECTION
DRIFT CHAMBER
PROPORTIONAL CHAMBER
COUNTER BANK

E-772 (Moss) Measurement of the Quark-Antiquark Sea in Nuclei

Case Western Reserve, Fermilab, Illinois/Chicago, LANL, Northern Illinois, Rutgers, South Carolina, SUNY/Stony Brook, Texas/Austin, Washington

Status: *Data Analysis*

We propose a precise measurement of the A dependence of Drell-Yan dimuon production in 900 GeV proton interactions with deuterium and calcium targets using the E-605 spectrometer. Emphasis will be placed on the kinematic region $M > 4$ GeV and $x_F > 0.2$, where one is most sensitive to the annihilation of beam valence quarks with target antiquarks. Such measurements will be very sensitive to the A dependence of the target sea quark distribution in the range $0.05 < x_2 < 0.3$, and hence provide important clues about the origin of the EMC (European Muon Collaboration) effect, and unique information on the general issue of quark distributions in nuclear matter.

The experiment will be performed using a modified version of the E-605 spectrometer. The high resolution properties of the spectrometer will allow simultaneous measurement of muon pairs from the upsilon resonances as well as from the Drell-Yan continuum. Analysis of the A dependence of resonance production should provide unique information about nuclear effects on the gluon structure function.

The Nevis transport/trigger processor system, which had been refurbished during the previous year, is ideally suited to recording high-rate muon pair data, thus allowing one to achieve superior statistical precision during the 1987 fixed-target running period. We hope to reduce the target-to-target absolute normalization errors to the level of 1% or better through a combination of beam, target, and dead-time monitoring. Data were taken during the 1987 fixed-target running period and the analysis of the data at Fermilab and LANL was finished in 1990. The final publication is now in preparation.

Publications

J. C. Gursky et al., Nucl. Instr. and Meth. A282, 62 (1989), Precision Nuclear Targets for Drell-Yan Cross Section Measurements at 800 GeV.

D. M. Kaplan et al., Phys. Rev. D41, 2334 (1990), Test of Scaling of the Massive Dihadron Cross Section.

R. Guo et al., Phys. Rev. D41, 2924 (1990), Improved Limit on Axion Production in 800 GeV Hadronic Showers.

D. M. Alde et al., Phys. Rev. Lett. 64, 2479 (1990), Nuclear Dependence of Dimuon Production at 800 GeV/c.

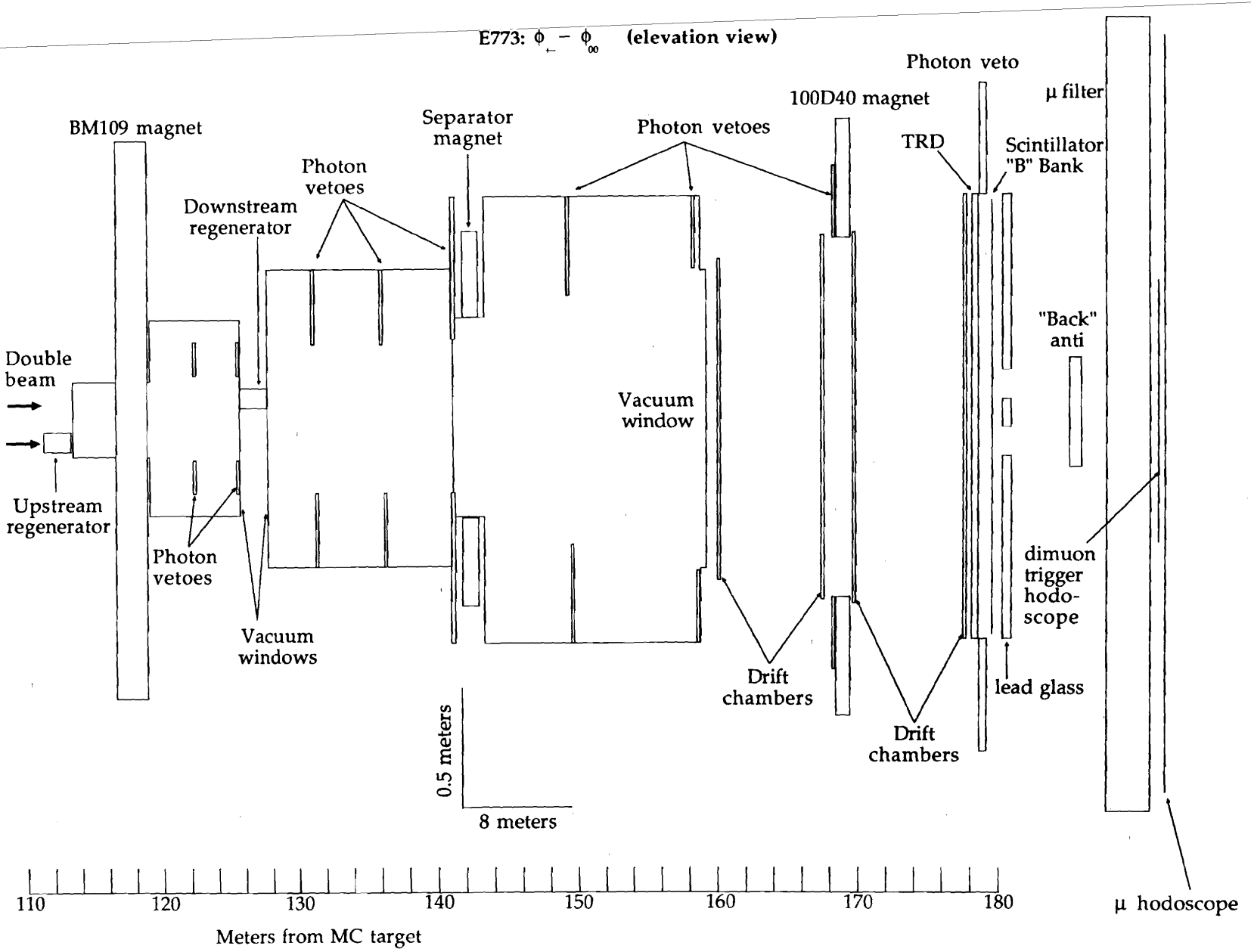
D. M. Alde et al., Phys. Rev. Lett. 66, 133 (1991), A-Dependence of J/Psi and Psi' Production at 800 GeV/c.

D. M. Alde et al., Phys. Rev. Lett. 66, 2285 (1991), Nuclear Dependence of the Production of Upsilon Resonances at 800 GeV.

P. L. McGaughey, et al., Phys. Rev. Lett. 69, 1726 (1992), Limit on the $\bar{d}/\bar{u}$ Asymmetry of the Nucleon Sea from Drell-Yan Production.

Thesis

Ming-Jer Wang, Case Western Univ. (1991).


E773: $\phi_{+-} - \phi_{00}$ (elevation view)
Photon veto
100D40 magnet
μ filter
BM109 magnet
Separator magnet
Photon vetoes
TRD
Scintillator "B" Bank
Photon vetoes
Downstream regenerator
"Back" anti
Double beam
Vacuum window
Upstream regenerator
Photon vetoes
dimuon trigger hodo-scope
Vacuum windows
Drift chambers
lead glass
Drift chambers
0.5 meters
8 meters
μ hodoscope
110
120
130
140
150
160
170
180
Meters from MC target

E-773 (Gollin) Measurement of the Phase Difference Between η_{00} and η_{+-} to a Precision of 1/2°

Chicago, Elmhurst, Fermilab, Illinois, Rutgers

Status: *Data Analysis*

The ratios of the amplitudes for K_L and K_S to decay into pairs of pions are

$$\eta_{00} = \frac{\mathrm{Amp}(K_L \to \pi^0\pi^0)}{\mathrm{Amp}(K_S \to \pi^0\pi^0)} \text{ and } \eta_{+-} = \frac{\mathrm{Amp}(K_L \to \pi^+\pi^-)}{\mathrm{Amp}(K_S \to \pi^+\pi^-)}.$$

The magnitudes of η_{00} and η_{+-}, measured by Fermilab E-731, are nearly identical. Given the approximate equality of $|\eta_{00}|$ and $|\eta_{+-}|$, CPT conservation requires $\Delta\varphi$, the phase difference between η_{00} and η_{+-}, to be at most a fraction of a degree.

To avoid systematic uncertainties associated with imperfect knowledge of kaon beam flux, detector acceptance, and resolution smearing effects, E-773 measures $\pi\pi$ decays using a double beam technique similar to that employed by E-731, our ε' experiment. One beam passes through a thin regenerator at the start of the fiducial decay volume, while the other beam traverses a thick regenerator 12 meters further upstream. The separation is chosen to make the $\pi\pi$ decay rate inside the decay volume insensitive to $\Delta\varphi$ for K_S from the upstream regenerator, and maximally sensitive to $\Delta\varphi$ for K_S from the downstream regenerator. The regenerators switch beams between beam spills; data were recorded simultaneously for $\pi^0\pi^0$ and $\pi^+\pi^-$ decays in both beams. The double ratio of rates,

$$R \equiv \frac{\Gamma_{00}(\text{upstream})/\Gamma_{00}(\text{downstream})}{\Gamma_{+-}(\text{upstream})/\Gamma_{+-}(\text{downstream})},$$

differs from unity by about 0.7% per degree of $\Delta\varphi$. "Upstream" and "downstream" refer to the beams containing regenerators in the upstream and downstream positions.

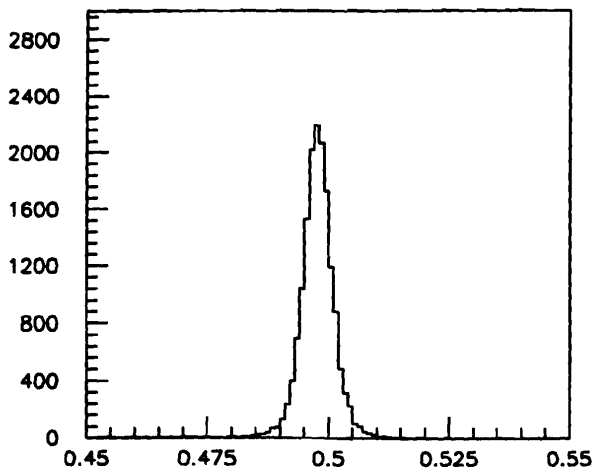
The E-773 detector is similar to the E-731 detector downstream of the two regenerators; both regenerators are solid scintillator to reduce backgrounds from inelastic K_S production. The $\pi^0\pi^0$ final states are measured in an 804-element lead glass array, while the $\pi^+\pi^-$ decays are detected in a 2000-channel drift chamber spectrometer. The neutral mode trigger requires four photons to strike the lead glass array; the glass and chambers are the same as those used by E-731.

We recorded about 450 million triggers during the first half of the 1991 fixed-target run (we reconfigured the detector for E-799 during the second half of the run). Before fiducial cuts, there are approximately 10^6 $K \to \pi\pi$ decays in our data sample, which should yield a measurement accuracy of 1/2° for $\Delta\varphi$. The entire data set has been run through a first pass analysis on the Amdahl. Monte

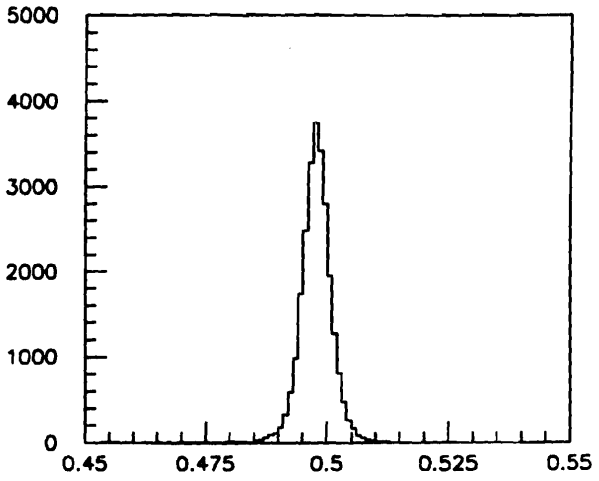
Carlo development is well along; we are working with an upgraded version of the E-731 Monte Carlo, which has been quite successful in describing that experiment's ε' data. We are working on generating lead glass and drift chamber calibration constants, and are progressing at a reasonable pace. We should have a preliminary result ("for internal use only") in early 1993, slightly more than a year after the end of the fixed-target run.

We expect to publish measurements of the phase difference between η_{00} and η_{+-}, the phase of η_{+-}, and the phase of $\eta_{+-\gamma}$, where $\eta_{+-\gamma}$ is the ratio of the amplitudes for K_L and K_S to decay to $\pi\pi\gamma$. It is possible that we will be able to set limits on the rate of H production, where the H is an exotic six-quark object. Shown in the accompanying figure are <u>preliminary</u> mass plots for $K \rightarrow \pi^0\pi^0$ and $K \rightarrow \pi^+\pi^-$ decays in the two beams from a small sample of the E-773 data.

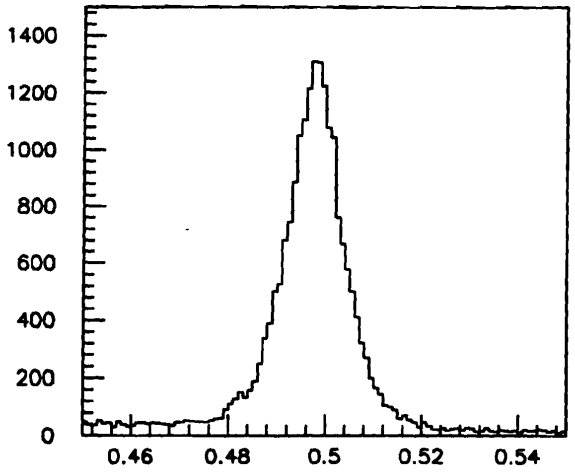
preliminary E773 mass plots, 20% of full data sample



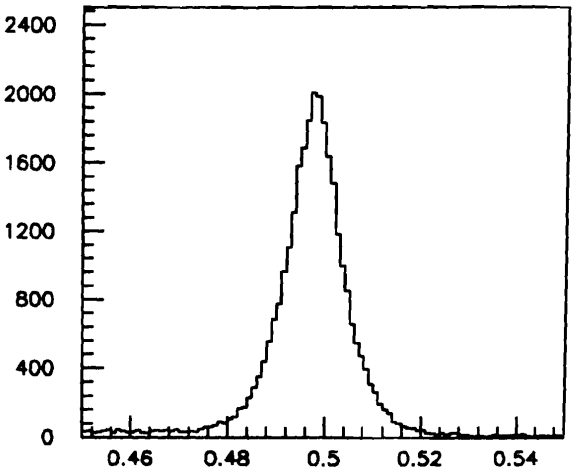
$\pi^+\pi^-$ mass, upstream regenerator



$\pi^+\pi^-$ mass, downstream regenerator

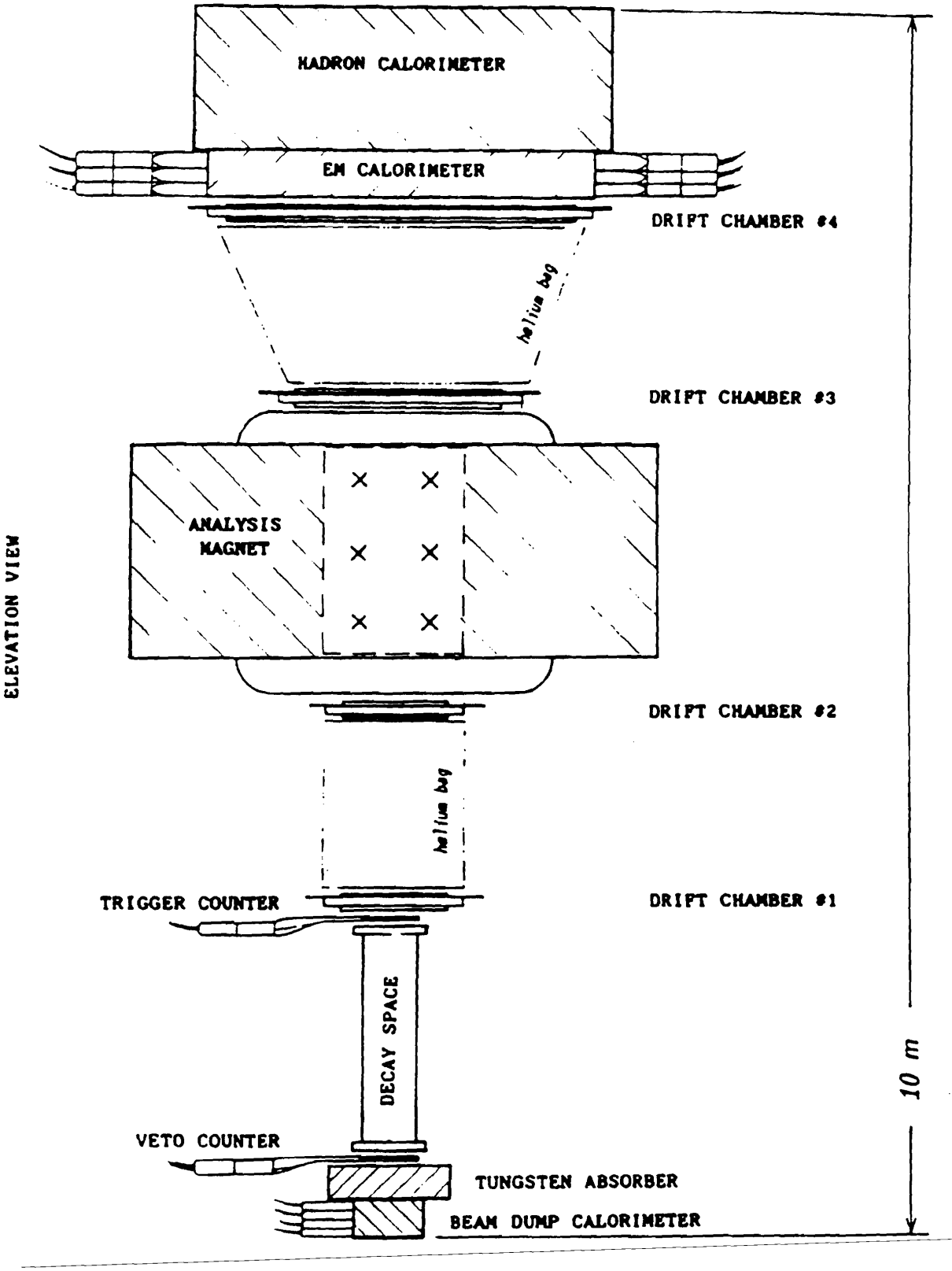


$\pi^0\pi^0$ mass, upstream regenerator



$\pi^0\pi^0$ mass, downstream regenerator

E-774


HADRON CALORIMETER
EM CALORIMETER
DRIFT CHAMBER #4
helium bag
DRIFT CHAMBER #3
ANALYSIS MAGNET
DRIFT CHAMBER #2
helium bag
TRIGGER COUNTER
DRIFT CHAMBER #1
DECAY SPACE
VETO COUNTER
TUNGSTEN ABSORBER
BEAM DUMP CALORIMETER
ELEVATION VIEW
10 m

E-774 (Crisler) Electron Beam Dump Particle Search

Fermilab, Illinois, Northeastern

Status: *Data Analysis*

The purpose of Experiment 774 is to search for light, neutral, short-lived particles that couple to the electron. Interest in the existence of such objects has recently been stimulated by the anomalous electron-positron pair production seen in heavy ion collisions at the GSI. These coincident electron-positron pairs occur with approximately equal lab energies, consistent with the production and subsequent decay of a neutral particle of mass 1.8 MeV/c^2. While the simplest models for this particle seem to be excluded by recent experiments, its existence has not yet been conclusively ruled out, and the debate over the 1.8 MeV particle has focussed our attention on a region of mass/lifetime where similar objects may exist and yet would not have been seen.

Experiment 774 will exploit the high energy and flux available in the new Wide Band Electron Beam to probe this unexplored region. The search will be performed by positioning a neutral decay spectrometer downstream from the electron dump of the Wide Band Beam. A neutral particle coupled to the electron will be produced in the dump by a bremsstrahlung-like process and will be observed by its decay in flight if its flight path is longer than the beam dump. The sensitivity of this method to short-lived particles is determined by the energy of the beam and the length of the beam dump. By using a short tungsten beam dump and the highest available beam energy, E-774 will extend the region of search by more than an order of magnitude beyond existing limits.

The E-774 apparatus consists of an active beam dump calorimeter followed by an evacuated decay volume, a simple magnetic momentum spectrometer, and trigger calorimeters. Upstream from the beam dump, a synchrotron radiation detector will be used to tag the electrons in the beam.

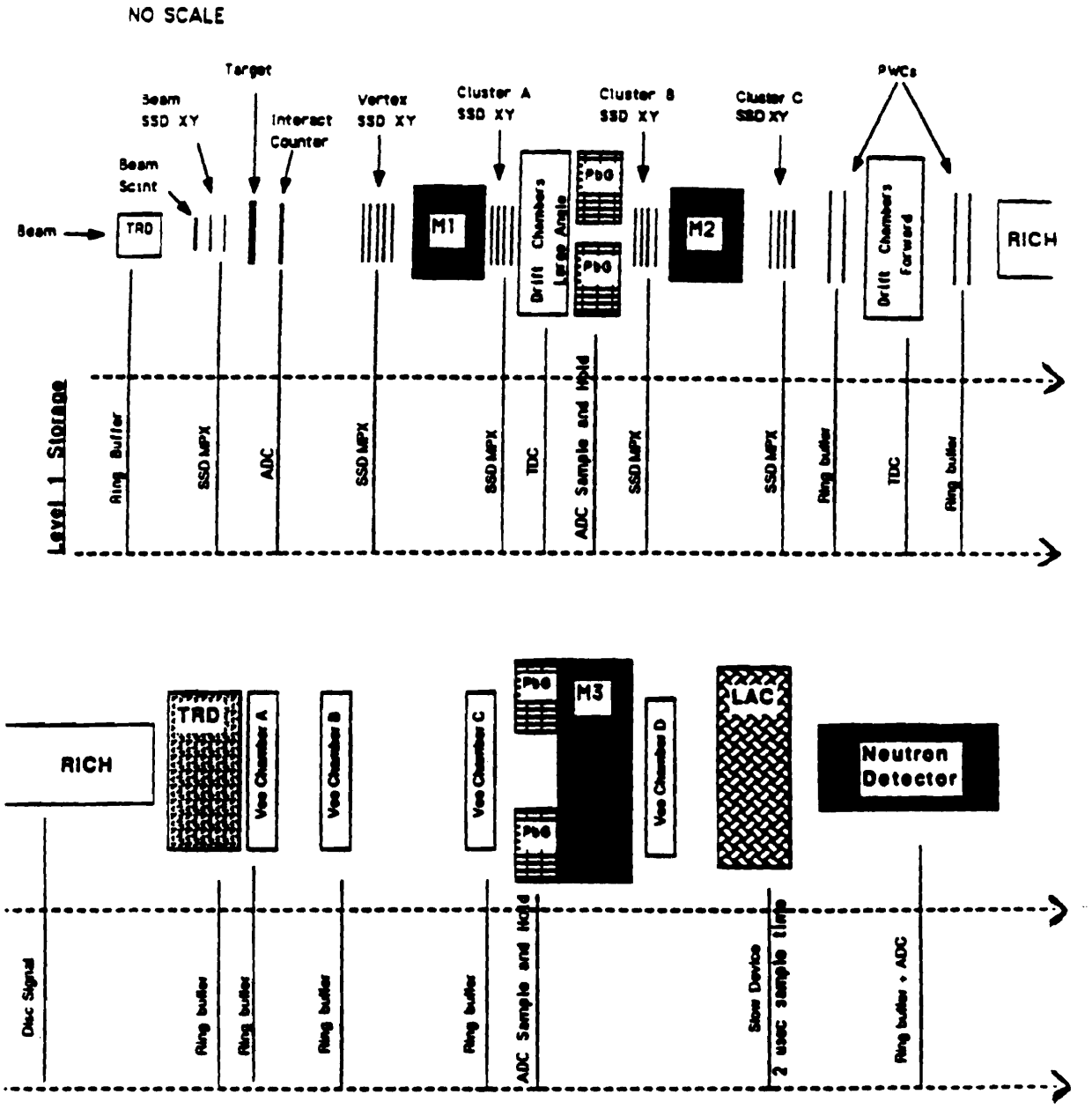
During the 1987-88 fixed-target run, E-774 completed engineering tests and obtained a preliminary data sample representing 1% of our proposed beam on target. The experiment, using a 275 GeV electron beam, was sensitive to particles up to 10 MeV/c^2 in mass and down to 4×10^{-16} sec in lifetime. None was found. The results exclude any such particle with mass below 4.1 MeV/c^2. During the 1990 fixed-target run, data were taken using a 350 GeV electron beam which will extend the reach of the experiment beyond masses of 7 MeV/c^2.

Publications

Scintillating Fiber Ribbon - Tungsten Calorimeter, A. Bross et al., Nuclear Instruments and Methods A286, 69 (1990).

Search for Short-lived Particles Produced in an Electron Beam Dump, A. Bross et al., Phys. Rev. Lett. 67, 2942 (1991).

E-781


NO SCALE
Target
Beam SSD XY
Interact Counter
Vertex SSD XY
Cluster A SSD XY
Cluster B SSD XY
Cluster C SSD XY
PWCs
Beam Scint
Beam
TRD
M1
M2
Drift Chambers Large Angle
Pb0
Drift Chambers forward
RICH
Level 1 Storage
Ring Buffer
SSD MPX
ADC
TDC
ADC Sample and Hold
Ring buffer
RICH
TRD
Vee Chamber A
Vee Chamber B
Vee Chamber C
Vee Chamber D
M3
LAC
Neutron Detector
Disc Signal
Slow Device
2 usec sample time
Ring buffer + ADC

E-781 (Russ) Study of Charm Baryon Physics

Bristol (Great Britain), Carnegie-Mellon, CBPF (Brazil), Fermilab, IHEP/Beijing (PRC), IHEP/Serpukhov (Russia), Iowa, ITEP (Russia), Moscow State (Russia), MPI/Heidelberg (Germany), PNPI (Russia), Rochester, Sao Paulo (Brazil), Tel Aviv (Israel), Washington

Status: *No Data Yet*

The study of charm baryons has lagged behind the recent progress in charm meson physics. The production of baryons by electron colliders or photon beams is small compared to meson production. Sample sizes of charm baryons comprise tens of events, compared to the thousands of events in the dominant decay modes of charm mesons. Because hadronic production of charm remains a difficult experimental challenge, current generation experiments have tended to run "open" triggers. The charm states produced are preponderantly charm mesons near x = 0, the dominant cross section in all hadronic processes. The design philosophy for E-781 is to use the fact that for all known baryons, the baryon/meson ratio increases dramatically at large x. The overall charm production cross section decreases, of course, but a good charm trigger can produce an enriched sample of charm baryons.

The charm trigger for E-781 is based on impact parameter, to provide a topology-independent trigger. All charm particles have a finite decay length, albeit short. A high resolution tracking device close to the target can select charm candidates on the basis of one or more tracks with a sufficiently large miss distance from the primary interaction point. Such a trigger is now conceivable because of recent advances in VLSI readout of silicon strip detectors and tremendous improvement in the online computer power available to an experiment. The spectrometer, shown in the accompanying figure, deploys a number of existing chambers and neutral particle detectors as well as the new silicon strip and pixel devices and the Ring-Imaging Cerenkov counter. By using VLSI amplifiers, E-781 can afford to make a vertex detector with 20 micron strips, totalling 50,000 channels of readout. This allows one to achieve 8-10 micron track spatial precision, and the large-x condition boosts all interesting tracks to high momentum (> 30 GeV) to minimize multiple Coulomb scattering errors. The computational trigger for E-781 is expected to give a charm enrichment factor at large x of at least 100.

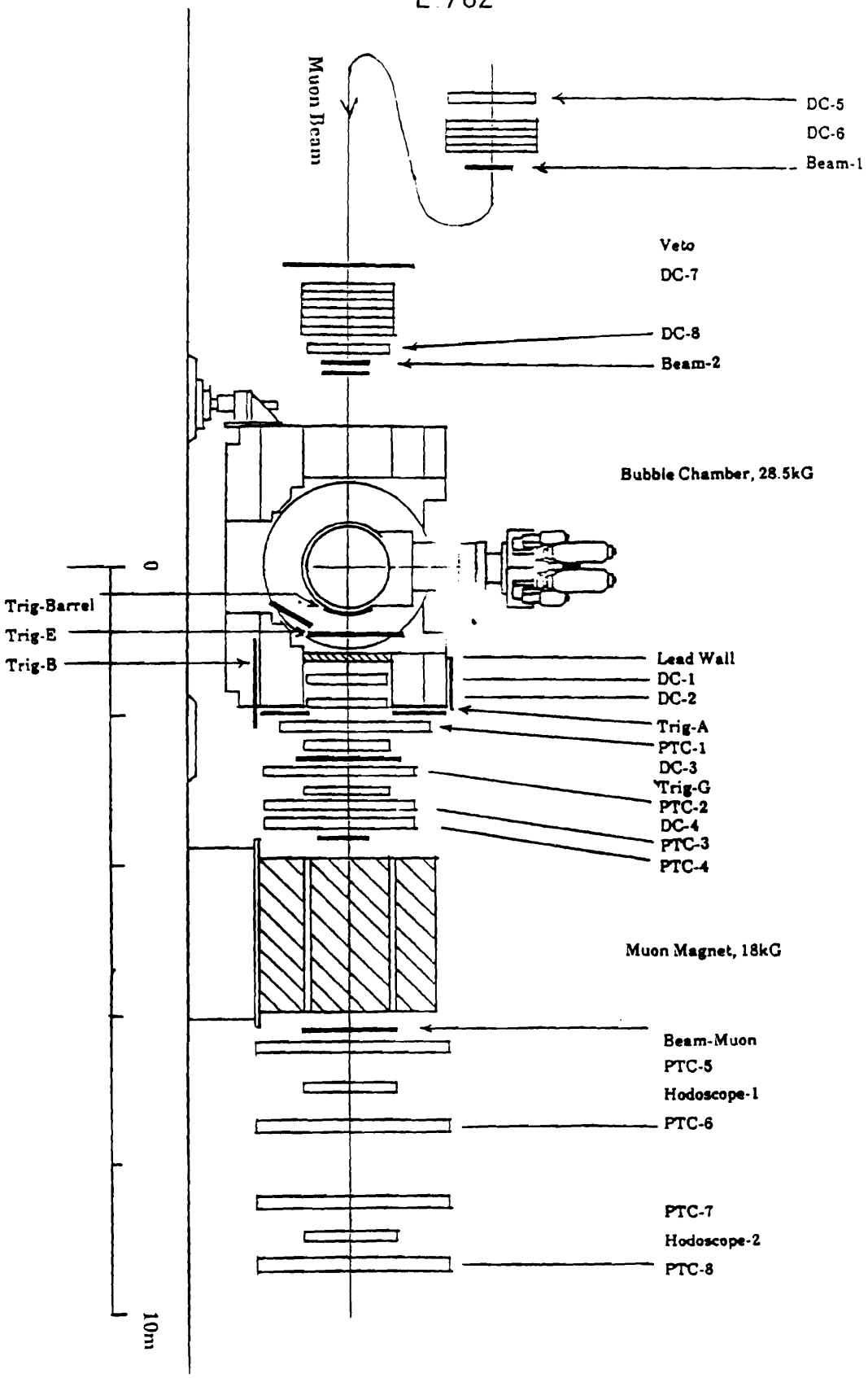
The physics questions for a charm baryon study have to do with both production and decay mechanisms. In charm baryon decays, the charm quark may decay or interact through exchange mechanisms with the light quarks. The exchange mechanisms are not suppressed by helicity considerations as they are in meson decays. A rich spectrum of two-body resonances may dominate the final states. Do they? The discovery of resonance-dominance of charm meson final states was a surprise, and the study of decay modes in baryons is an important goal of E-781. Such a study requires good particle identification and also good photon detection. We have both. Comparison of non-leptonic and semi-leptonic modes is also important. The transition radiation detector in front of the Ring-

Imaging Cerenkov is a clean tag on electrons. From a theoretical point of view, understanding the ordering of the decay rates of the four different stable charm baryons will give useful insight into which of the several competing decay mechanisms dominates these states.

Strong interaction physics can be studied in the production of charm baryons. The observation of a p_t-dependent polarization in the production of strange baryons has led to a resurgence of interest in spin-effects at high energies. What happens with charm baryons? E-781 will measure polarizations. There is evidence for leading production of charm baryons from some experiments, but this is not universally observed. E-781 will do a detailed x-dependence measurement of charm baryon production from several different incident beams.

The physics potential of the experiment touches many little-known areas of heavy quark physics. The focus on baryons is especially appropriate for a hadron machine. The experiment asks for 1200 hours of data-taking time following 400 hours of setup. Initial tests were done in the 1990 fixed-target run.

E-782


Muon Beam
DC-5
DC-6
Beam-1
Veto
DC-7
DC-8
Beam-2
Bubble Chamber, 28.5kG
0
Trig-Barrel
Trig-E
Trig-B
Lead Wall
DC-1
DC-2
Trig-A
PTC-1
DC-3
Trig-G
PTC-2
DC-4
PTC-3
PTC-4
Muon Magnet, 18kG
Beam-Muon
PTC-5
Hodoscope-1
PTC-6
PTC-7
Hodoscope-2
PTC-8
10m

E-782 (Kitagaki) Muon Exposure in the Tohoku High Resolution Bubble Chamber

Brown, Fermilab, IHEP/Beijing (PRC), MIT, ORNL,
Sensyu (Japan), Sugiyama Jogakuin (Japan), Tennessee,
Tohoku Gakuin (Japan), Tohoku (Japan)

Status: *Data Analysis*

E-782 is a muon experiment using the Tohoku High-Resolution One-Meter Freon Bubble Chamber. A four-month run in 1990 yielded 330,000 usable pictures and 13,000 inelastic muon events ($\nu > 4$ GeV, $Q^2 > Q^2_{min}$, in a good fiducial volume).

Unique features of this experiment are to see vertices with high resolution optics and to take low Q^2 data down to Q^2_{min} with small systematic bias. Physics aims are:

1. Structure function in the low Q^2 region down to Q^2 ~0.01 GeV^2 with small systematic uncertainty.

2. Production of vector mesons, strange particles and charm particles in a wide range of Q^2 down to Q^2 ~0.01 GeV^2.

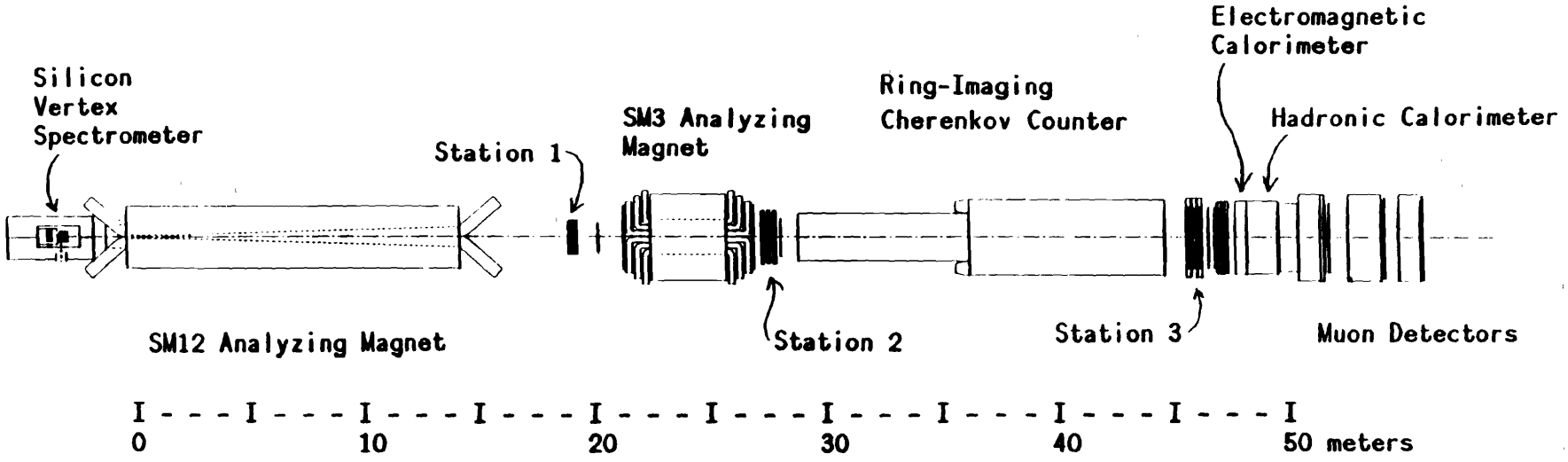
3. Energy dependence of meson-baryon pair production in charm and strange channels.

4. Comparison of neutrino interactions and muon interactions in the same 4π detector.

5. EMC effect. The new tagging method developed in E-745, using the nuclear debris, will be applied on the muon interactions.

6. Formation of hadrons.

Film analysis is well underway at Tohoku, Tohoku Gakuin, Sensyu and Tennessee. Approximately one-third of the film will be analyzed in 1990 and the first publication will occur in early 1992.



E789 SCHEMATIC (PLAN VIEW)

E-789 (Kaplan / Peng) b-Quark Mesons and Baryons

Abilene Christian, Academia Sinica (Taiwan), Chicago, Fermilab, LANL, LBL, Northern Illinois, South Carolina

Status: *Data Analysis*

E-789 aims to study charmless two-body two-prong decays of neutral b-quark hadrons. Sensitivity to inclusive beauty decays to J/ψ and to two-prong decays of charm will also be achieved. Charmless dihadronic beauty decays

$$B_d, B_s, \Lambda_b \rightarrow \pi^+\pi^-, K^+K^-, p\bar{p}, \pi^\pm K^\mp, p\pi^-, \bar{p}\pi^+, pK^-, \bar{p}K^+$$

are of particular interest for several reasons: 1) Since they are sensitive to the Kobayashi-Maskawa matrix element for b → u conversion, their observation (or non-observation) can help determine whether the Kobayashi-Maskawa (six-quark) approach to K^0 CP-violation is valid; 2) They offer a possible avenue to the study of CP violation in the B system, since they are predicted to have relatively large CP-violating contributions; 3) The rate of b → u conversion is highly uncertain at present: it could vary by an order of magnitude and still be consistent with the results of the CLEO group.

E-789 is an exploratory effort to address this physics using the existing MEast beamline and upgraded E-605/772 spectrometer. This spectrometer, shown in the accompanying figure, uses two large analysis magnets and twenty-three planes of scintillation-counter hodoscopes and wire chambers to measure charged-particle tracks passing above and below a central beam dump. Particles are identified by electromagnetic and hadronic calorimeters, muon detectors, and a ring-imaging Cherenkov counter. An array of silicon microstrip detectors pinpoints the vertices of two-prong beauty decays to < 1mm in z. Since the average decay distance for the decays accepted by the downstream spectrometer is 1.2 cm (for a 1.3×10^{-12} sec B lifetime), a vertex cut 0.7 cm downstream of the mm-long target will retain more than half of these decays while greatly suppressing the copious background of dihadrons produced in the target. This suppression, combined with the excellent predicted mass resolution of ~ 0.2% at 5.3 GeV, will ensure adequate signal-to-background ratio for measurement of branching ratios as small as $\sim10^{-6}$.

The E-605/772 spectrometer has demonstrated its suitability over several years for high-precision measurements at high luminosity and high counting rates. Such measurements require not only high-rate particle detectors but also high-rate data acquisition and sophisticated triggering capability. These are furnished by the Nevis Labs Data Transport and hardware trigger processor systems, which have been suitably upgraded for the beauty running. The upgraded data acquisition system is capable of recording ≈ 50 megabytes per beam spill on 8mm tape cassettes. The upgraded trigger processor reconstructs the decay vertex using information from the silicon microstrip detectors, providing on-line suppression of non-heavy-quark triggers by up to an order of magnitude.

The first physics run for E-789 took place in July 1991 - January 1992. The beam time was divided roughly equally between charm and beauty running (two months each). A total of ~1.5×10^9 events, collected over a total of ~8.0×10^4 beam spills, have been recorded on ~1300 8mm tapes. Table I lists the various data sets from this run.

Table I. Summary of E-789 Data Sets

Data set	Quark studied	Spectrometer setting	Target material	Target dimensions x × y × z (mm^3)	Total live interactions
1	charm	1000A	Au	50 × 0.1 × 0.8	4×10^{11}
2	charm	1000A	Be	50 × 0.1 × 0.8	1×10^{11}
3	beauty	1500A	Au	50 × 0.2 × 3	3×10^{13}
4	charm	900A	Au	50 × 0.15 × 1.5	7×10^{10}
5	charm	900A	Be	50 × 0.15 × 1.5	1×10^{11}
6	charm→ dileptons	900A	Au	50 × 0.15 × 1.5	4×10^{11}
7	charmonium	2400A	Cu	Beam dump	2×10^{13}
8	charmonium	2400A	Be	50 × 100 × 915	5×10^{12}

The charm running was crucial for tuning our newly installed silicon-strip detectors and vertex trigger processor. Furthermore, the nuclear dependence of D meson production, measured with gold and beryllium targets, should give valuable insight into the origin of the J/ψ A-dependence observed at the same beam energy in E-772. By use of our vertex-reconstructing trigger processor and upgraded data-recording system, we were able to take up to 2×10^{10} protons per pulse on the 800-μm-long gold target (4 MHz interaction rate).

Our beauty data were collected at a spectrometer setting which simultaneously optimized sensitivity for $B \rightarrow J/\psi$ and for $B^0 \rightarrow$ dihadrons. We ran at a 50-MHz interaction rate, constrained by radiation limits at our trailer. The beauty data correspond to a total of 3.0×10^{13} interactions. Using standard assumptions for the size, shape, and A-dependence of the $b\bar{b}$ cross section, this should provide some 100 reconstructible $B \rightarrow J/\psi$ events. Assuming no dihadronic decays are observed after all cuts, the 90%-c.l. upper limit for each dihadronic B^0 decay mode is estimated at 1.0×10^{-4} (and similar limits for $B \rightarrow e^+e^-$, $\mu^+\mu^-$, and $e\mu$).

In addition to the measurements discussed above, we have also measured the A-dependence of J/ψ production at very large x_F ($0.3 < x_F < 1.0$). This was accomplished by detecting dimuons produced in the copper beam dump, as well as dimuons produced in a thick block of beryllium placed upstream of the beam dump. During the 1990 test run we had also taken data with three different targets to measure the A dependence of J/ψ production at x_F near 0. These data supplement the results at more forward x_F published by E-772.

The 900A data sets 4,5 have been analyzed for dihadron final states. Depending on how tight we make the vertex cuts, we see between 300 and 700 $D^0 \rightarrow K\pi$ events from each target, yielding measurements of the A-dependence exponent α to a statistical precision of ±0.02. Our preliminary D^0 production cross section and lifetime measurements are consistent with previous measurements.

An RMS mass resolution of ≈ 5 MeV is observed for the D meson peak. Data set 6 was obtained by prescaling the non-dilepton triggers to provide the maximum sensitivity for possible $D^0 \rightarrow$ dilepton decays. The 90%-c.l. upper limits for $D^0 \rightarrow$ dileptons should be $\approx 0.5 \times 10^{-5}$ each for e^+e^-, $\mu^+\mu^-$, and $e\mu$.

Preliminary results from an analysis of ≈ 15% of the 1500A dimuon sample were presented[19] at the Dallas ICHEP meeting. Of 15,000 J/ψ and 300 ψ' decays observed, six J/ψs have decay vertices located at least 7 mm downstream of the target. These J/ψ events are consistent with originating from the $B \rightarrow J/\psi X$ inclusive decays. Analysis of the dielectron and dihadron data samples are underway.

E-789 has been the subject of several talks and papers[1-24]. Two M. S. theses[9,14] and one Ph.D dissertation[23] on E-789 have been completed.

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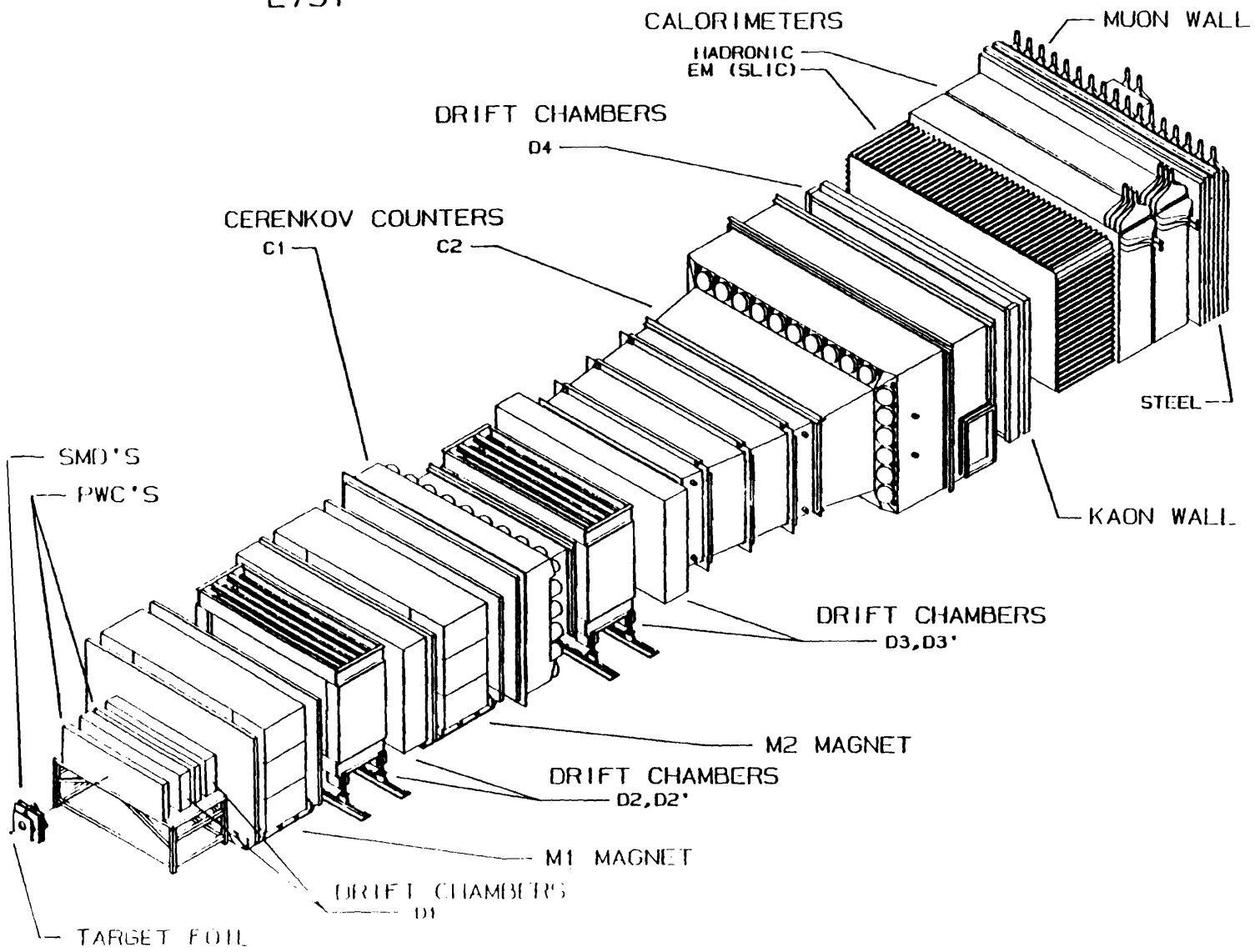
TAGGED PHOTON SPECTROMETER
E791



E-791 (Appel / Purohit) Hadroproduction of Charm and Beauty

UC/Santa Cruz, CBPF (Brazil), Cincinnati, CINVESTAV (Mexico), Fermilab, IIT, Mississippi, Ohio State, Princeton, Rio de Janeiro (Brazil), Sao José do Rio Preto (Brazil), Tel Aviv (Israel), Tufts, Wisconsin, Yale

Status: *Data Analysis*

E-791 has broken new ground in charm and beauty physics. Located in the Tagged Photon Laboratory it has a 500 GeV/c π^- beam incident on a foil target. Charm and beauty events are selected by a high-E_T trigger made possible by the segmented nature of the electromagnetic and hadronic calorimeters. The detector has twenty-three planes of high-resolution silicon strip devices followed by thirty-seven planes of drift-chambers and PWC's. Two Cerenkov detectors and a muon wall are used with the calorimeters to identify particle types. The experiment took data in the 1991 fixed-target run and wrote to tape over 20 billion events. Extrapolating from a preliminary analysis of a few percent of this data, we know that about 200,000 charm decays will be fully reconstructed (20 × E-691's sample of 10,000 fully reconstructed charm decays). It should be possible to reconstruct a couple of hundreds of beauty decays partially and a few B decays fully.

While several features of charm decays are now understood (the pattern of lifetimes, the small contributions from exchange, annihilation and color-suppressed diagrams) there remain several open questions. These include the degree to which two-body decays dominate, the role of final state interactions and, of course, the pattern of lifetimes of the charm-strange baryons. E-791, being a very high statistics as well as open geometry experiment, is ideal for observing rare branching ratios into fully charged modes and has good background rejection for γ and π^0 modes.

Semileptonic and leptonic modes of charm particle decay are of particular interest because they probe the weak charm decay vertex without the complications of final-state interactions. E-691 had marginal sensitivity to $\pi e\nu$ and $\phi e\nu$ decays and E-791 will have important results there. Branching ratio measurements for even the copious modes are currently at the 10% level and will be improved. E-791 has good sensitivity to D_s^+ and Λ_c^+ semileptonic decays, will measure form-factors and polarization effects in these decays and will search for purely leptonic decays such as $D_s^+ \to \tau^+\nu_\tau$ and $D^+ \to \mu^+\nu_\mu$.

D^0-$\bar{D}^0$ mixing is predicted to be unobservably small in the Standard Model, but Wolfenstein has shown the standard quark-box-diagram calculations to be unreliable and predicts that mixing could be as large as 0.5%. This is the current level at which it is ruled out; hence E-791's factor-of-twenty increase in statistics explores an interesting new region. The higher statistics will also allow precision studies of charm hadroproduction. The experiment's sample of partially reconstructed B mesons should be sufficient to extract the total $b\bar{b}$ production cross-section.

E-791 is simultaneously exploring challenging new technologies. The vast number of reconstructed events was made possible by fast front-end electronics (<40 μs readout times), fast data acquisition and high-speed writing to 8 mm tape (10 Mbyte/sec). The second phase of the experiment emphasizing B physics has been given a new proposal number, P-829.

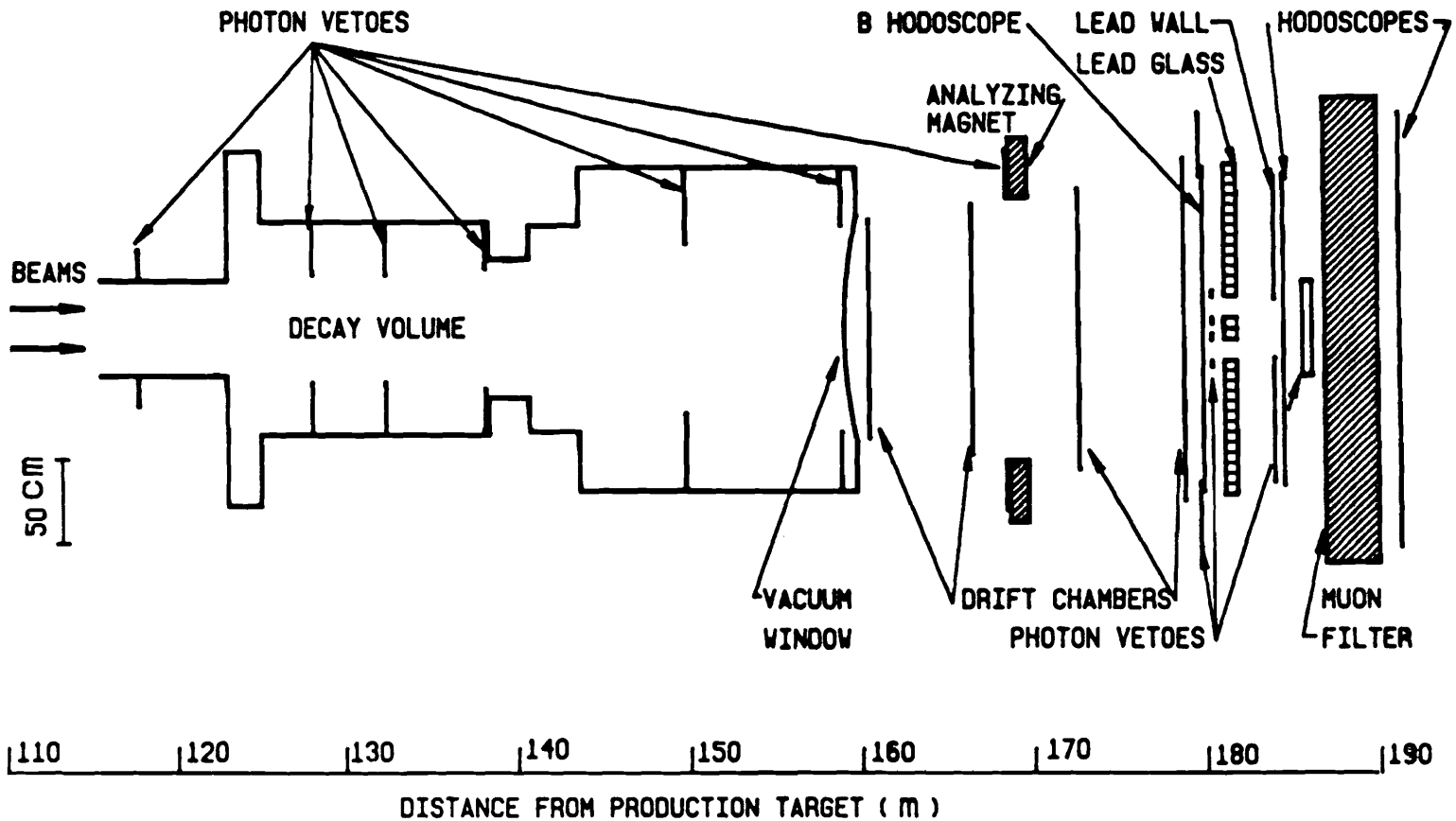
Nine Ph.D. students gained hardware and running experience on E-791, but have completed or are working on physics analyses based on E-691 or E-769 data. All more recent Ph.D. students, eighteen as of this writing, have both their hardware and analysis experience with E-791. The first Ph.D. thesis based on E-791 data is anticipated for the coming year.

E-793 (Lord) Emulsion Exposure to Protons of Energies Close to 1000 GeV

Kazakh State/Alma-Ata (Kazakhstan), Washington Nat. Phil. Inst., Washington

Status: *No Data Yet*

It is proposed to carry out an experiment in which protons of energies close to 1,000 GeV bombard emulsion nuclei and 10 micrometer diameter tungsten targets. The objective will be to determine if the quark-gluon phase of matter can be produced in proton collisions. Collisions with very small tungsten targets will make it possible to observe the possible decay of the quark-gluon matter for times of the order of 10^{-14} seconds. Central collisions will be examined but also detailed studies will be made of diffractive collisions with tungsten. There is some evidence that diffractive collisions might be important in the production of quark-gluon states.


PHOTON VETOES
B HODOSCOPE
LEAD WALL
LEAD GLASS
HODOSCOPES
ANALYZING MAGNET
BEAMS
DECAY VOLUME
50 CM
VACUUM WINDOW
DRIFT CHAMBERS
PHOTON VETOES
MUON FILTER
110
120
130
140
150
160
170
180
190
DISTANCE FROM PRODUCTION TARGET (m)

E-799 (Wah / Yamanaka) A Search for the Rare Decay $K_L \rightarrow \pi^0 l^+ l^-$

UCLA, Chicago, Colorado, Elmhurst, Fermilab, Illinois, Osaka (Japan), Rutgers

Status: *Phase I - Data Analysis*
Phase II - No Data Yet

E-799 was proposed to be executed in two phases. Phase I (E-799I) finished data-taking early in 1992 and Phase II (E-799II) will be performed during the next fixed-target run in the mid-90s. E-799 focuses upon rare decays, particularly $K_L \rightarrow \pi^0 l^+ l^-$ (where l could be electron, muon, or neutrino) that could have large direct CP violating amplitudes.

E-799I took data in the last Fermilab fixed-target running period from October 1991 until January 1992 using the high intensity MC beamline. About 1000 video cassettes (1 terabyte; 500 million triggers) of data were collected. The data collected has sensitivities approaching 10^{-10} for a variety of rare decays. The important decay modes to be studied are $K_L \rightarrow \pi^0 ee$, $\pi^0 \mu\mu$, $\pi^0 \nu\nu$ (all three have dominant direct CP-violating amplitudes); $K_L \rightarrow \mu\mu\gamma$, eeee, $\mu\mu ee$, $\pi^+\pi^- ee$ (Dalitz and related form factor study); $\pi^0 \rightarrow ee\gamma$, $\pi^0 \rightarrow eeee$ (π^0 Dalitz and related form factor study); $\pi^0 \mu e$, $\pi^0 \rightarrow \mu e$ (lepton number violation); and a few others such as $K_L \rightarrow ee\gamma\gamma$ which is very important for background understanding for $K_L \rightarrow \pi^0 ee$.

We are able to cleanly measure the $\pi^0 \rightarrow$ ee branching ratio, using the very clean and copious $K \rightarrow 3\pi^0$ decays. QED calculation predicts a branching ratio of 4.8×10^{-8}. Model-dependent calculations that include terms from off-shell photons typically yield a branching ratio between $(6\text{-}7) \times 10^{-8}$. Experimentally, this decay has presented some significant challenges, and with controversial results. Measurements in the late '70s suggest that the branching ratio is well above the unitarity limit and Standard Model predictions. However, a recent experiment from the SINDRUM collaboration has placed an upper limit of 1.3×10^{-7} at 90% confidence, apparently contradicting earlier results. In E-799I data, we observed a reconstructed mass peak of nine events with small background and determined the branching ratio to be $(7.8 \pm 3.4) \times 10^{-8}$.

The table below summarizes some results presented at the APS DPF92 meeting:

Decay Mode	Evts seen bef E-799	E-799I	E-799I results
$\pi^0 \rightarrow$ ee	(contentious)	9	$(7.8 \pm 3.4) \times 10^{-8}$
$K_L \rightarrow eeee$	2	28	$(4.5 \pm 1.2) \times 10^{-8}$
$K_L \rightarrow \mu\mu\gamma$	1	160	$(3.88 \pm .32) \times 10^{-7}$
$K_L \rightarrow \pi^0 \mu\mu$	br$<2.5 \times 10^{-6}$	-	br$<2. \times 10^{-8}$

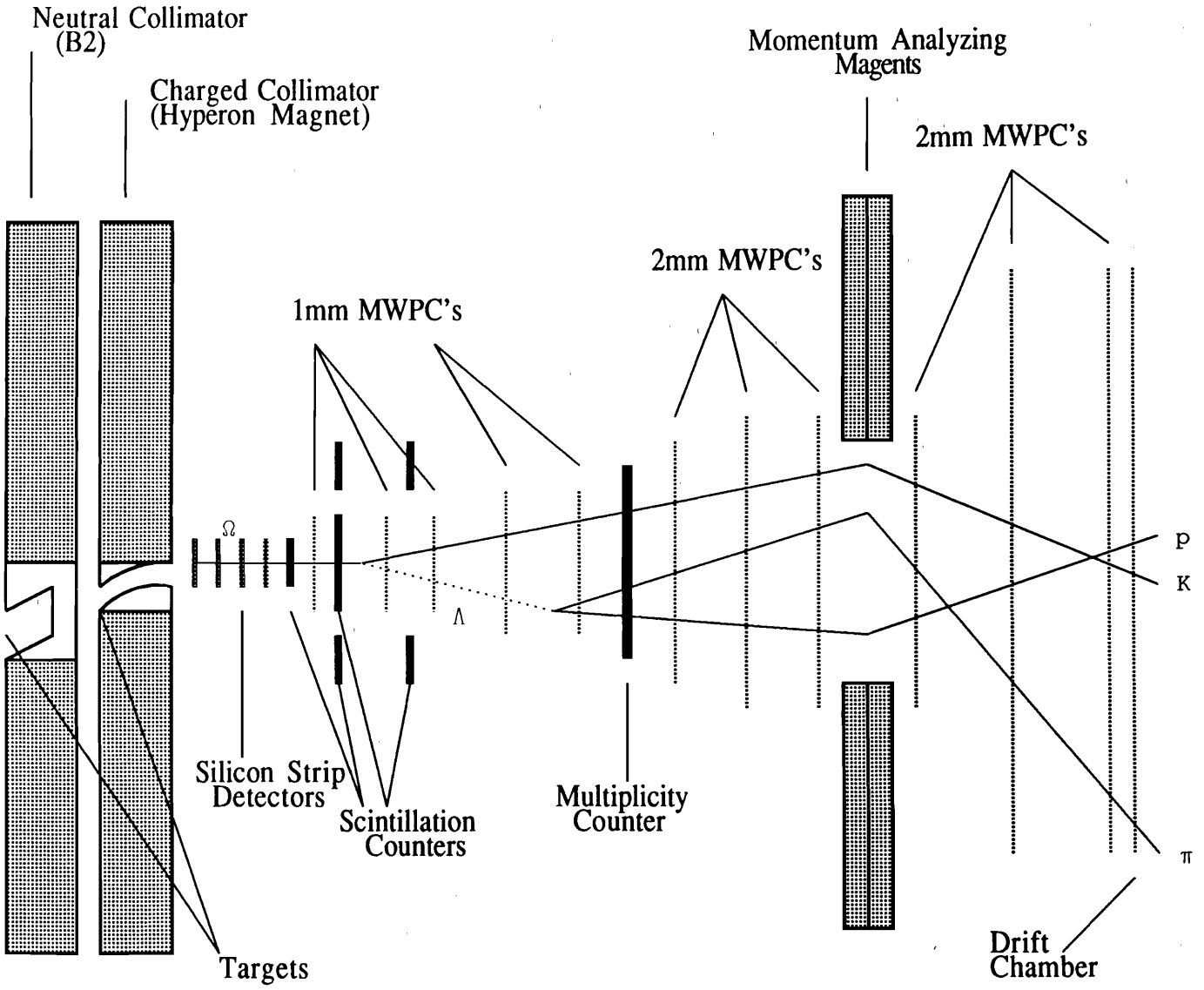
It should be noted that the open geometry of the E-799 detector, the high acceptances for multi-body final states, and the high energy of the decaying kaons, leads to unprecedented sensitivities to numerous rare and not so rare kaon

and neutral pion decays. We are expecting many new physics results from the E-799I data.

R&D and preparation for KTeV: E-799II

We will be using the same technique with a substantially improved detector and new beamline to reach a sensitivity for 4-body decays of 10^{-12}. The most important detector upgrade will be the electromagnetic calorimeter. We have studied both BaF_2 and pure CsI and have selected the CsI option. The same detector will be used for 2π ε'/ε studies (E-832). This program is nicknamed 'KTeV' and was approved in February 1992. A comprehensive design report on the KTeV program was produced in April 1992 outlining the physics goals, the beam, the siting, and the detector in much detail. This KTeV report also describes the full details of the calorimeter material tests and thus its justification for various parameters.

Currently no definite beamline nor experimental site has been selected. The R&D and building of the detector apparatus efforts, however, have not been slowed down. We have decided to use the "digital photomultiplier" for the calorimeter after many studies and tests with the prototypes. Other major detector elements include a very hermetic scintillation fiber photon veto, a multi-module Transition Radiation Detector for independent pion/electron identification, and a very high speed, high throughput data acquisition system.



Plan View of E800 Spectrometer (not to scale)

E-800 (Johns / Rameika) High Precision Measurement of the Omega Minus Magnetic Moment

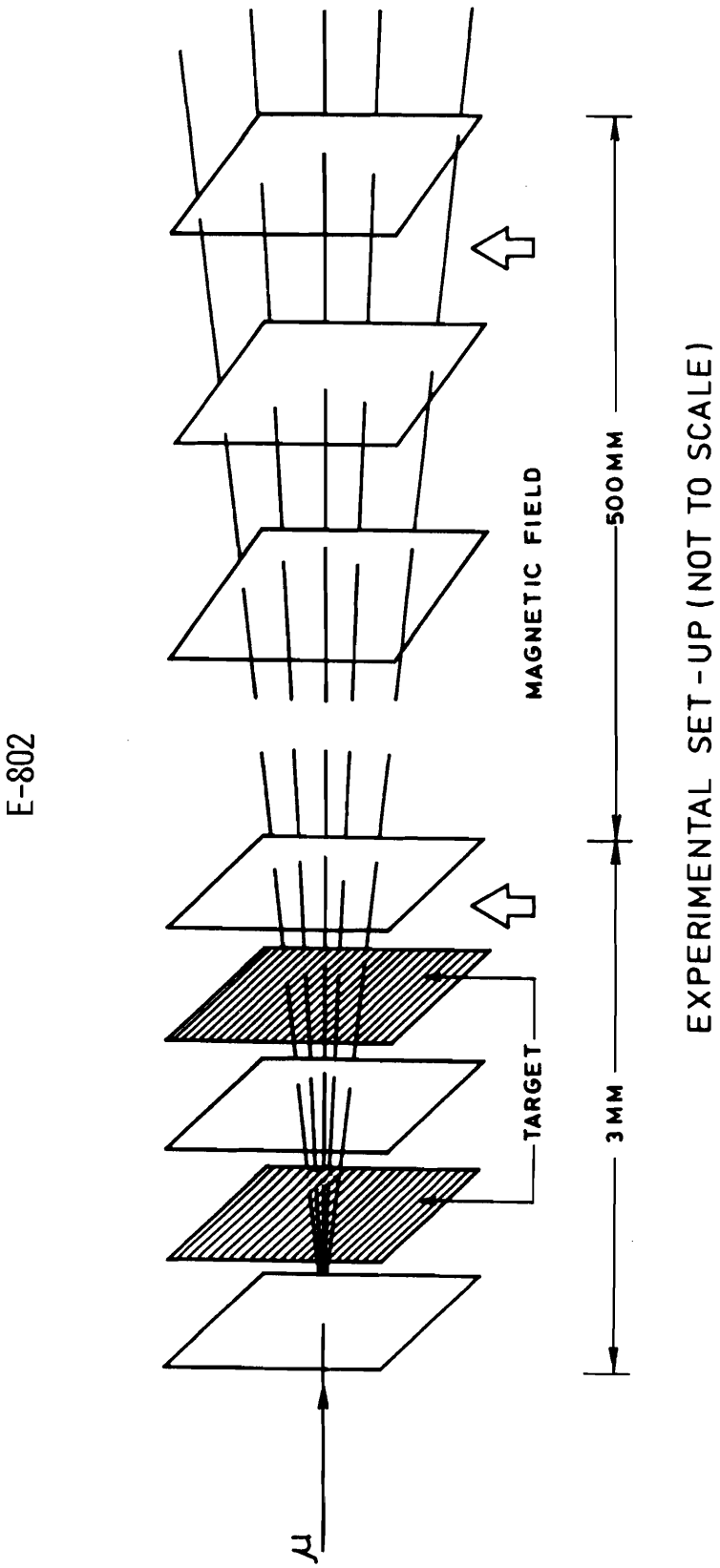
Arizona, Depauw, Fermilab, Michigan, Minnesota

Status: *Data Analysis*

The goal of E-800 is to measure the magnetic moment of the Ω^- to 0.04 nuclear magnetons or better. A new technique (neutral production) which uses an unpolarized neutral beam is used to produce polarized omegas. By virtue of the omega's simple quark structure, a precise measurement of the omega moment will provide valuable input to models of how quarks combine into hadrons. Measurements of the polarization of Ω's and Ξ^-'s using both unpolarized and polarized neutral hyperon beams should help explore the mechanism of inclusive hyperon polarization, a longstanding puzzle in high energy physics.

E-800 completed a successful fixed-target run from July, 1991 until January, 1992. In the neutral production mode, we collected a total of 200,000 Ω's and 24 million Ξ^-'s. At a lower hyperon precession magnet B field, we collected 90,000 Ω's and 11 million Ξ^-'s. E-756 produced polarized Ω's using a polarized neutral beam (spin transfer mode) and in this mode we collected 40,000 Ω's and 4 million Ξ^-'s.

A preliminary analysis of the Ω and Ξ^- polarizations from neutral production and spin transfer modes has been completed using approximately 40% of the Ω data and 5% of the Ξ^- data. We find good agreement with E-756 in the Ω and Ξ^- polarizations from the spin transfer mode. We disovered that Ω's produced from an unpolarized neutral beam are polarized with approximately the same magnitude as from spin transfer (about 6%) but in the opposite direction. We also found that Ω's are produced at five times the rate compared with the spin transfer mode. Using the sample of polarized Ω's from the neutral production mode we obtain a preliminary Ω magnetic moment of -2.1 ± 0.1. We also discovered that Ξ^-'s produced by an unpolarized neutral beam are unpolarized, a fact not easily understood in terms of standard polarization models. Preliminary E-800 results were presented at the XXVI International Conference on High Energy Physics in Dallas, the 10th International Spin Symposium in Nagoya, Japan and the DPF meeting at Fermilab. We expect to complete a final pass reconstruction run this winter and publish final magnetic moment and polarization results in the Spring of 1993. Other physics being pursued on E-800 include a precision measurement of the decay asymmetry and dibaryon searches.



EXPERIMENTAL SET-UP (NOT TO SCALE)

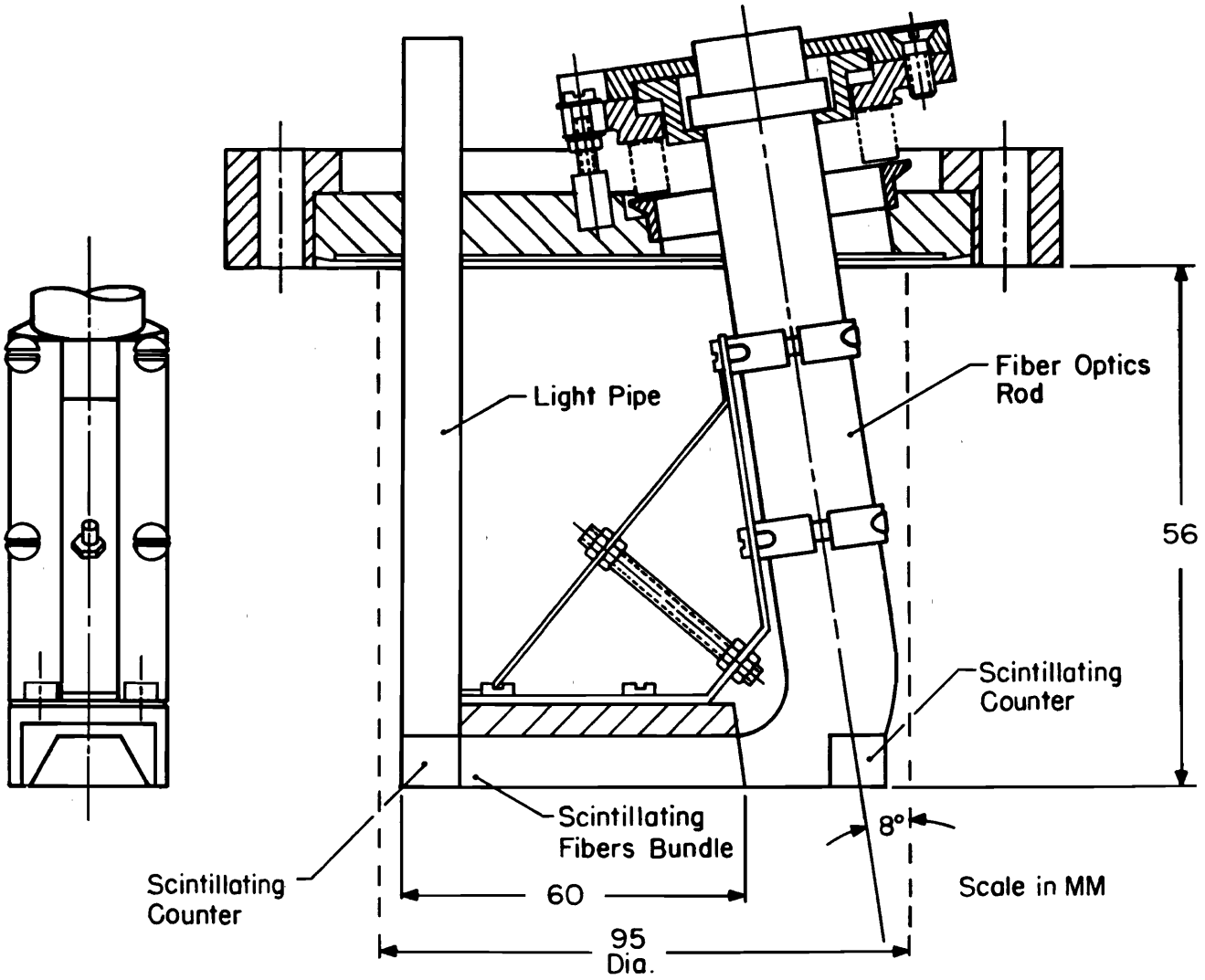
E-802 (Chatterjee / Ghosh) Deep Inelastic Muon Interactions with Nuclear Targets and an Emulsion Telescope

Fermilab, Jadavpur (India)

Status: *Data Analysis*

E-802 is an emulsion experiment, the objectives of which are to study muon interactions in the deep inelastic region to obtain new information on the EMC effect and deep inelastic structure functions of different specific targets.

A 420 GeV muon beam was incident on the 13 cm^2 emulsion stack; the stack was exposed to a total of 1.1×10^7 muons, with a maximum density of 10^6 muons/cm^2.


Light Pipe
Fiber Optics Rod
56
Scintillating Counter
Scintillating Fibers Bundle
8°
Scintillating Counter
60
95 Dia.
Scale in MM

E-811 (Orear) Physics at E0 for Collider Run Ib

CERN, Cornell, Fermilab, Lebedev (Russia), World Lab (Switzerland)

Status: *No Data Yet*

The goals are two-fold: (1) to get new, accurate values of the rho value (ratio of real to imaginary part of the forward scattering amplitude) and total cross section at the full collider energy, and (2) to test out a new detector scheme designed to do the same thing at the SSC. These new detectors are designed to measure very small angle elastic scatterings within a millimeter or two of the beam. They consist of bundles of 100 micron scintillating fibers lined up parallel to the beam and remotely adjustable in position. Light generated in a fiber is led outside the vacuum tank by glass fiber optics undergoing a 90 degree bend to a series of two image intensifiers. The image on the final phosphor is registered on a CCD and dumped onto data tape after an appropriate trigger. The voltage signal on the final phosphor allows it to behave as the anode of a photomultiplier tube and can be used as part of the trigger. This new detector has been tested in a 10 GeV pion beam at CERN and found to be 100% efficient with zero background, both for the CCD image and the fast pulse obtained from the anode. Such a detector is equivalent to a bundle of 15,000 independently readable scintillation counters, each with 100% efficiency, with zero noise, no cracks, and position resolution in both dimentions of about 30 microns.

Four such detectors will be installed at the same far positions used by E-710, during the shutdown between Runs Ia and Ib. In E-710 the detectors were able to get within 2.2 mm of the beam without running into too much background. Analysis of simulated data has shown that if these new detectors can take data down to 2.5 mm of the beam that the rho value can be obtained to an accuracy of 0.017 and the total cross section to 1 mb. This is based on a sample obtained by running for 10 hours at 10 events per second. Most of the running will be in the parasitic mode, but we are planning for a total of one week of dedicated running near the end of Run Ib.

E-815

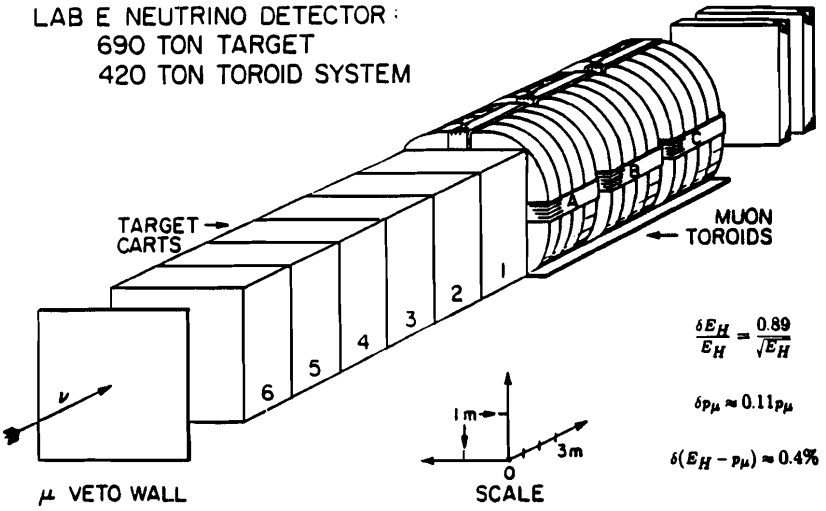
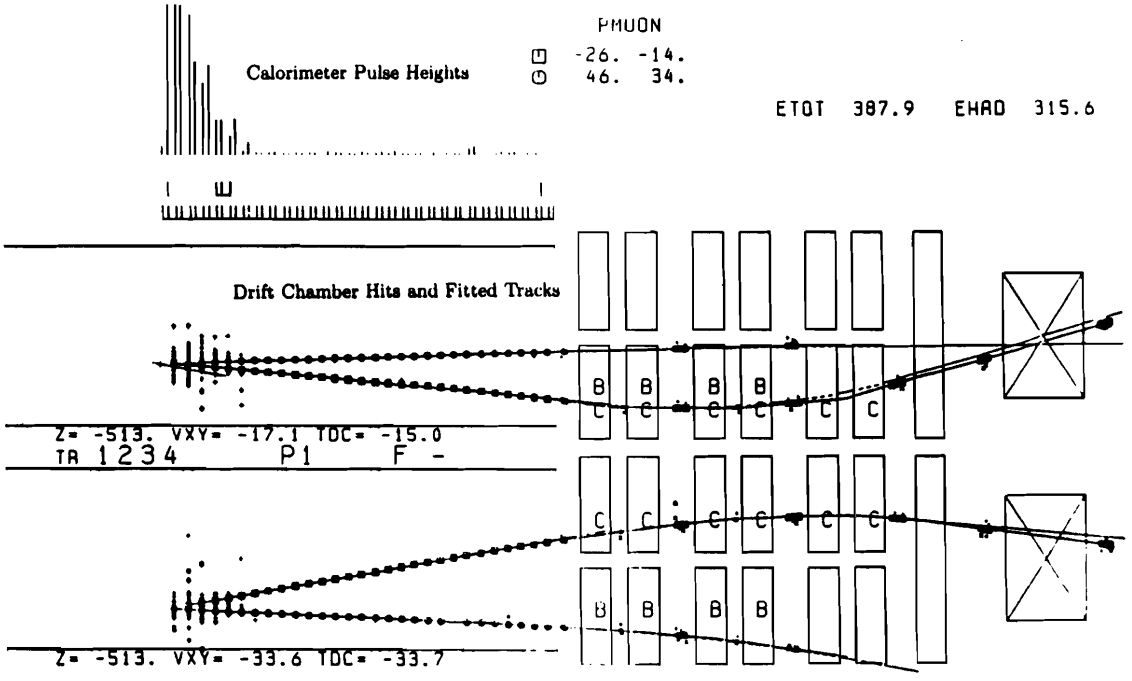


Fig. 1. The Lab E (CCFR) neutrino detector. The target calorimeter consists of six independently movable target carts, numbered 1 through 6 as indicated. The muon spectrometer consists of three toroidal magnet units (A, B and C), and a pair of drift chamber stations at the far downstream end.



E-815 (Shaevitz) Precision Measurements of Neutrino Neutral Current Interactions Using a Sign-Selected Beam

Adelphi, UC/Irvine, Cincinnati, Columbia,
Fermilab, Harvard, MIT, Oregon, Rochester

Status: *No Data Yet*

A major physics goal of the 1990's will be precision tests of the electroweak sector of the Standard Model. Our understanding of this subject is such that the measurables in e^+e^- collisions at the Z^0 pole, the hadron collider results, and deep inelastic neutrino-nucleon neutral and charged current scattering should all agree. A central issue is the role of the top quark, which in the Standard Model enters in the propagator and vertex electroweak corrections for all processes beyond the tree level. Given the comprehensive foundation of the Model, precise experimental data will incisively confront the theory.

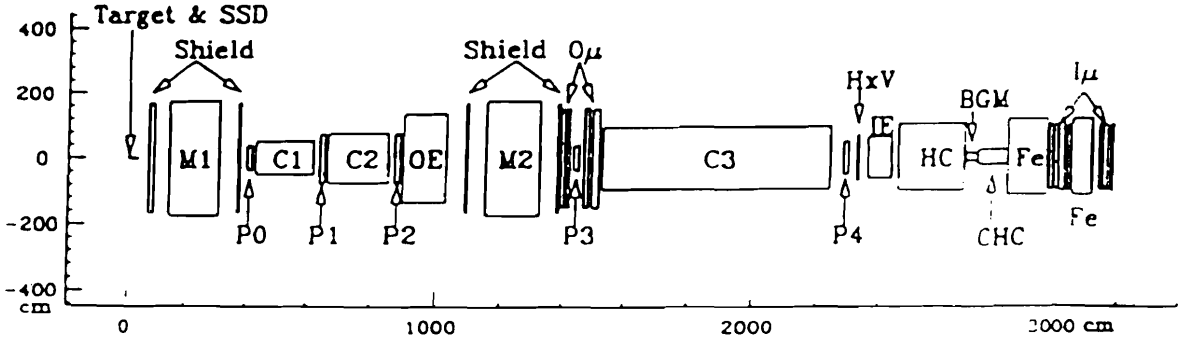
Our experiment will exploit the full power of the high energy and intensity of the Tevatron neutrino beam to significantly improve the precision of the electroweak parameters determined in deep-inelastic neutrino-nucleon scattering. With a sign-selected neutrino beam, neutrino and antineutrino interactions can be separately measured and important systematic errors can be controlled.

The objectives of Phase I of our program are: (1) measurement of $\sin^2\theta_W$ with an expected error of $\delta(\sin^2\theta_W) = \pm 0.0029$ (statistical and systematic errors combined), and (2) determination of ρ to a level of ± 0.0049 (statistical and systematic errors combined).

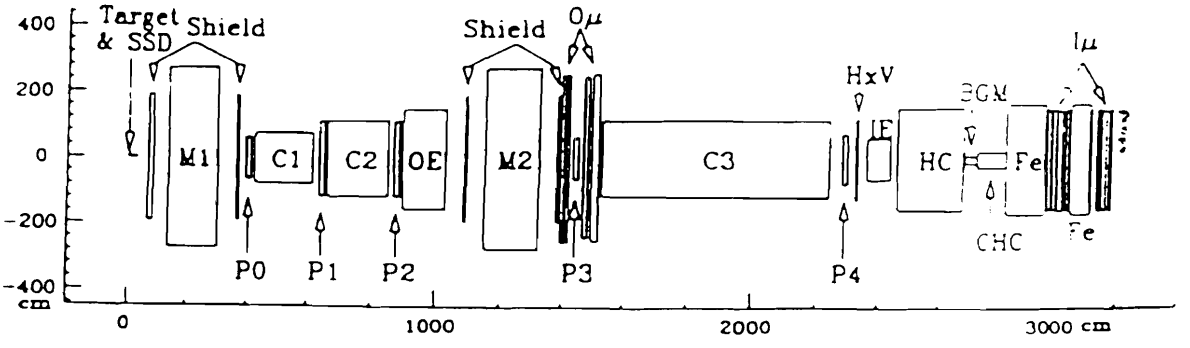
This level of precision on the electroweak parameters can be quantified by the restrictions imposed on the top quark mass, where we find $\delta m_t = \pm 30$ GeV/c^2. These limits will always be complementary to the determinations at electron and hadron colliders given the entirely different channels probed in deep-inelastic neutrino-nucleon scattering.

The proposed Phase I program can be conducted with modest expense to Fermilab. The chief costs are the construction of the new sign-selected neutrino beam and the recommissioning of the Lab E neutrino detector. We view Phase I of this effort as the initial stage of a comprehensive program of neutrino physics at Fermilab in the 1990's. The Phase II program will extend the electroweak physics measurements and will probe QCD at a new level of precision.

E-831



Top View



Side View

E-831 (Cumalat) A High Statistics Study of States Containing Heavy Quarks Using the Wideband Photon Beam and the E-687 Multiparticle Spectrometer

UC/Davis, Colorado, Fermilab, INFN/Frascati (Italy), Illinois/Champaign, Korea (Korea), Lebedev (Russia), INFN/Milano (Italy), Milano (Italy), North Carolina, Northern Kentucky, Northwestern, Notre Dame, INFN/Pavia (Italy), Pavia (Italy), Puerto Rico, South Carolina, Tennessee, Vanderbilt

Status: *No Data Yet*

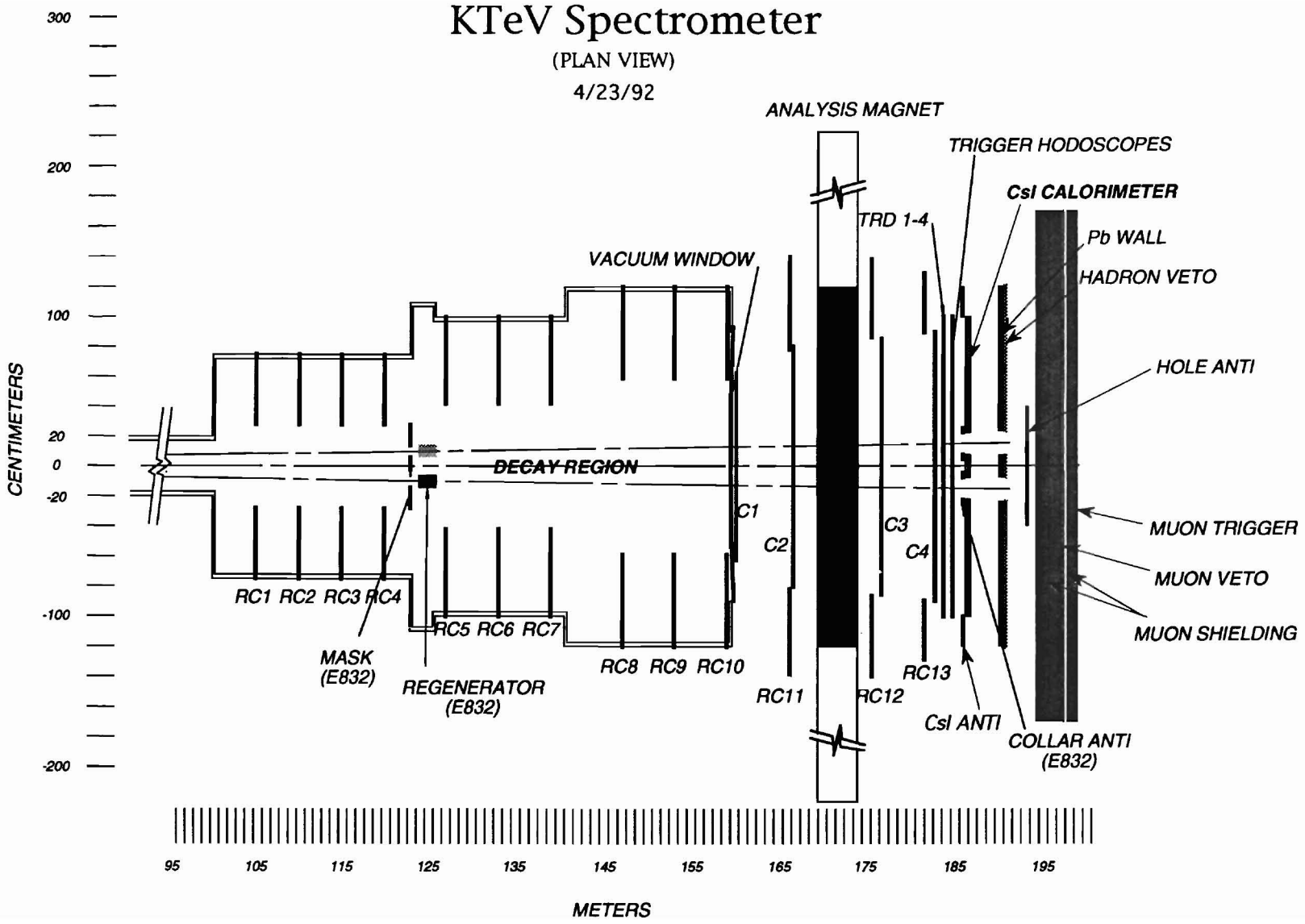
The spectrometer used in Fermilab Experiment 687 to study the photoproduction and decay of charmed particles will be upgraded to enable it to accumulate 10^6 fully reconstructed charm particles. The physics will involve high precision studies of the D semileptonic decays, QCD studies of Double D events, a measurement of the absolute branching fraction for the D^0, searches for D^0 mixing, CP violation, rare and forbidden decays, fully leptonic decays of the D^+ and a systematic investigation of charm baryons and their lifetimes. The estimates of charm yields are based on reasonable extrapolations from channels we have already studied in E-687.

The increased yield of charm will be obtained by (1) running at over five times the average luminosity of E-687 and (2) increasing the efficiency of the detector by a factor of two. The increased luminosity will be achieved by lowering the beam energy to 250 GeV, using the positron arm of the beam, running at higher average proton intensity, and (hopefully) employing 900 GeV incident protons. Additional gains can come from using a thicker radiator and/or a thicker target.

The detector must be upgraded to handle the increased luminosity. Major changes are:

1. Speeding up the hadron calorimeter and using it in the First Level Trigger to reduce deadtime;
2. Improving the response time of the vertex microstrip detector;
3. Deadening the PWCs in the beam region and adding straw tube planes to cover the deadened regions. The straw tubes will, in fact, cover the whole aperture, thereby improving tracking over the entire spectrometer;
4. Speeding up the front end electronics by a factor of ten;
5. Speeding up the data acquisition system; and
6. Improving the Second Level Trigger.

Additional changes will be made to the muon system, the Cerenkov system, and the electromagnetic calorimeters. The photon energy tagging represents a very difficult problem, but is necessary for the study of production dynamics.


KTeV Spectrometer
(PLAN VIEW)
4/23/92
ANALYSIS MAGNET
TRIGGER HODOSCOPES
CsI CALORIMETER
TRD 1-4
Pb WALL
VACUUM WINDOW
HADRON VETO
HOLE ANTI
DECAY REGION
C1
C2
C3
C4
MUON TRIGGER
MUON VETO
MUON SHIELDING
RC1 RC2 RC3 RC4
RC5 RC6 RC7
RC8 RC9 RC10
RC11
RC12
RC13
MASK
(E832)
REGENERATOR
(E832)
CsI ANTI
COLLAR ANTI
(E832)
CENTIMETERS
300
200
100
20
0
-20
-100
-200
95
105
115
125
135
145
155
165
175
185
195
METERS

E-832 (Hsiung / Winstein) A New Tevatron Search for Direct CP Violation in the 2π Decays of the Neutral Kaon

UCLA, Chicago, Colorado, Elmhurst, Fermilab, Illinois, Osaka (Japan), Rice, Rutgers

Status: *No Data Yet*

The goal of this new experiment is a measurement of the ratio of the CP violation parameters, ε'/ε, in the $K^0\bar{K}^0$ system to a precision of 1.0×10^{-4}, to search for direct CP violation phenomenon in the neutral kaon system at the Fermilab Tevatron. This is a factor of seven improvement in precision over the previous Fermilab experiment E-731 and the CERN experiment NA31.

So far the only manifestations of CP violation are a result of a lack of symmetry in the rate of particle-antiparticle transitions in the $\Delta S = \pm2$ processes $K^0 \leftrightarrow \bar{K}^0$. This experiment addresses the issue as to whether the CP violation is confined to a $\Delta S = 2$ interaction (the superweak model) or has a $\Delta S = 1$ component, as naturally arises in the standard six-quark model (Cabbibo-Kobayashi-Maskawa). Although there is considerable uncertainty in the predictions for the size of ε'/ε in the standard model, this measurement would severely constrain the models and, if non-zero but small ($<10^{-3}$), would give an important new "handle" on the phenomenon of CP violation, even were the "top" found in the current Tavatron Collider run.

The experiment makes use of a double-beam technique, essentially the same as E-731, whereby both K_L and K_S decays are studied simultaneously: a totally active regenerator is placed in one of the beams to provide a K_S component with very small background and the regenerator is alternated from beam to beam to reduce the effects of any beam and detector asymmetries. The goal of the experiment is to collect 6×10^6 $K_L \rightarrow 2\pi^0$ events along with 1.2×10^7 $K_S \rightarrow 2\pi^0$ "normalizing" events, and at the same time to collect 3×10^7 $K_L \rightarrow \pi^+\pi^-$ events and 6×10^7 $K_S \rightarrow \pi^+\pi^-$ "normalizing" events for the double ratio measurement.

For this effort and Phase II of E-799 (rare K decay experiment), a new KTeV facility will be constructed which takes full advantage of the Tevatron primary protons up to 5×10^{12} per spill and its superior duty cycle to provide a factor of two to three increase in usable K_L flux in the 100 GeV/c region over E-731. Special attention has been paid to significantly improving the neutral beam stability, reducing the neutral beam halo, and reducing the background muon rate. The spectrometer consists of a 60 meter vacuum decay space, electromagnetic calorimetry, tracking and magnetic spectrometer, nearly hermetic photon vetoes, and hadron and muon detectors.

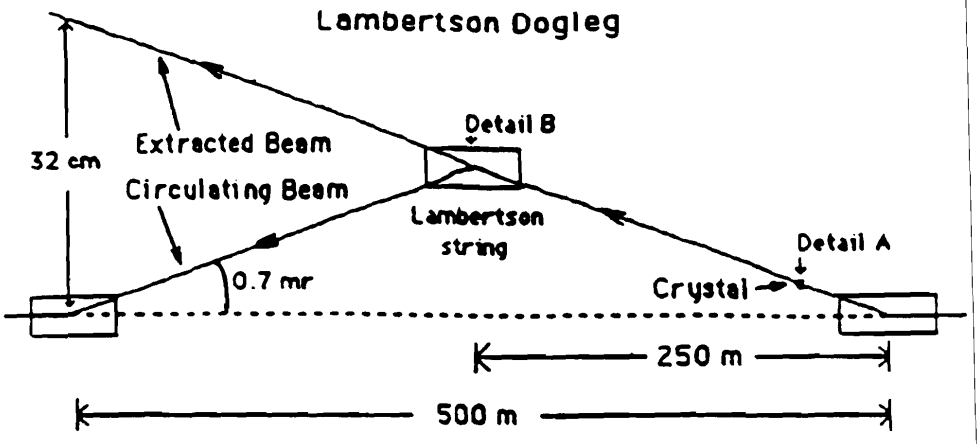
The neutral final state ($2\pi^0$) is detected with a new 2m × 2m high resolution (better than 1%) electromagnetic calorimeter made of an array of 3200 blocks of pure CsI crystals. A newly developed "digital" PMT-base (current switcher and flash ADC base at 53 MHz) is used to read out the CsI array for a better understanding of the calorimeter in the higher rate environment. Triggering in the

neutral mode is effected by counting clusters in the CsI array by a hardware cluster finder. The $\pi^+\pi^-$ are detected with a 2000 sense-wire high-rate drift chamber spectrometer. Scintillation hodoscope counters and an improved track processor are used for the charged trigger. The most serious background, $K_L \rightarrow 3\pi^0$, is significantly reduced by means of a nearly hermetic system of seventeen new photon-veto anti-counters, designed to detect extra gammas outside the solid angle of the CsI calorimeter including the beam holes. Inelastic regeneration is greatly reduced by the detection of the production of secondaries in the totally active scintillator regenerator. The $K_{\mu 3}$ background is rejected by the muon shielding and anti-counters behind the CsI calorimeter, and by crude hadron vetoes. A new buffer matrix data acquisition system with a level-3 parallel processing filter is used for the high data rate environment.

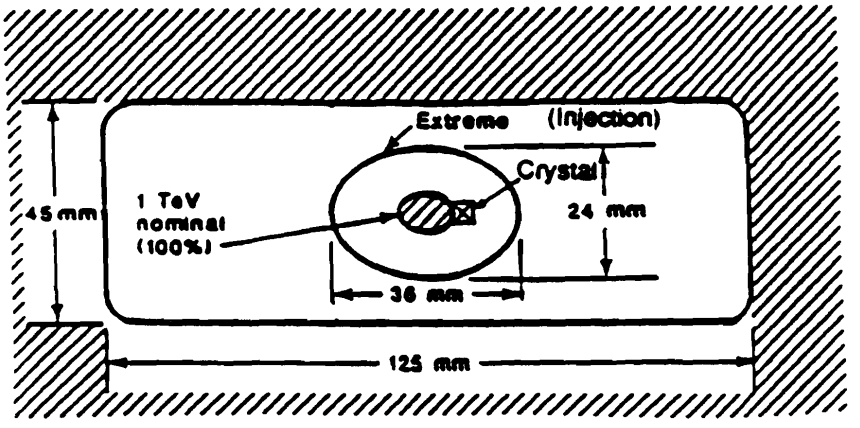
With the long decay space, the experiment can also measure the K_L-K_S interference in both the $2\pi^0$ and $\pi^+\pi^-$ data sample to obtain $\Delta\phi$, the phase difference between ϕ_{00} and ϕ_{+-}, to a precision of 0.2^o, a very stringent test of CPT invariance.

The experiment is now in preparation for the next fixed-target run. A KTeV Design Report (FN-580) has been prepared for the project.

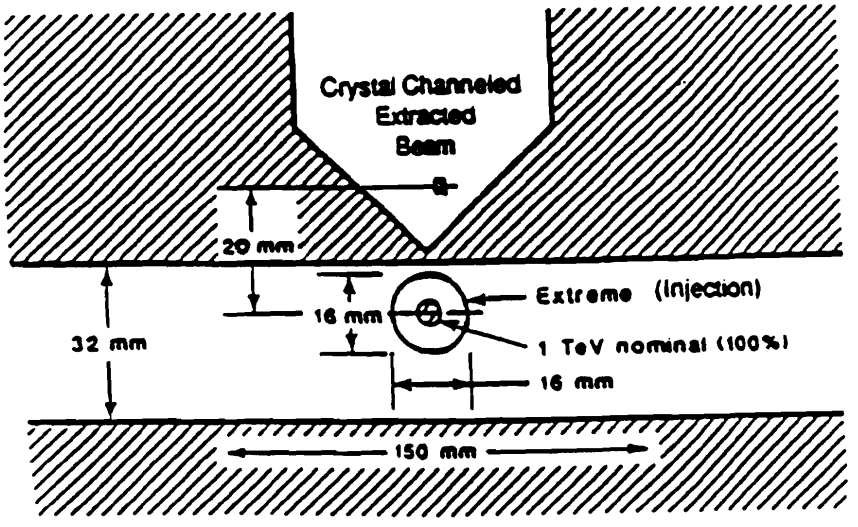
E-853



Detail A



Detail B



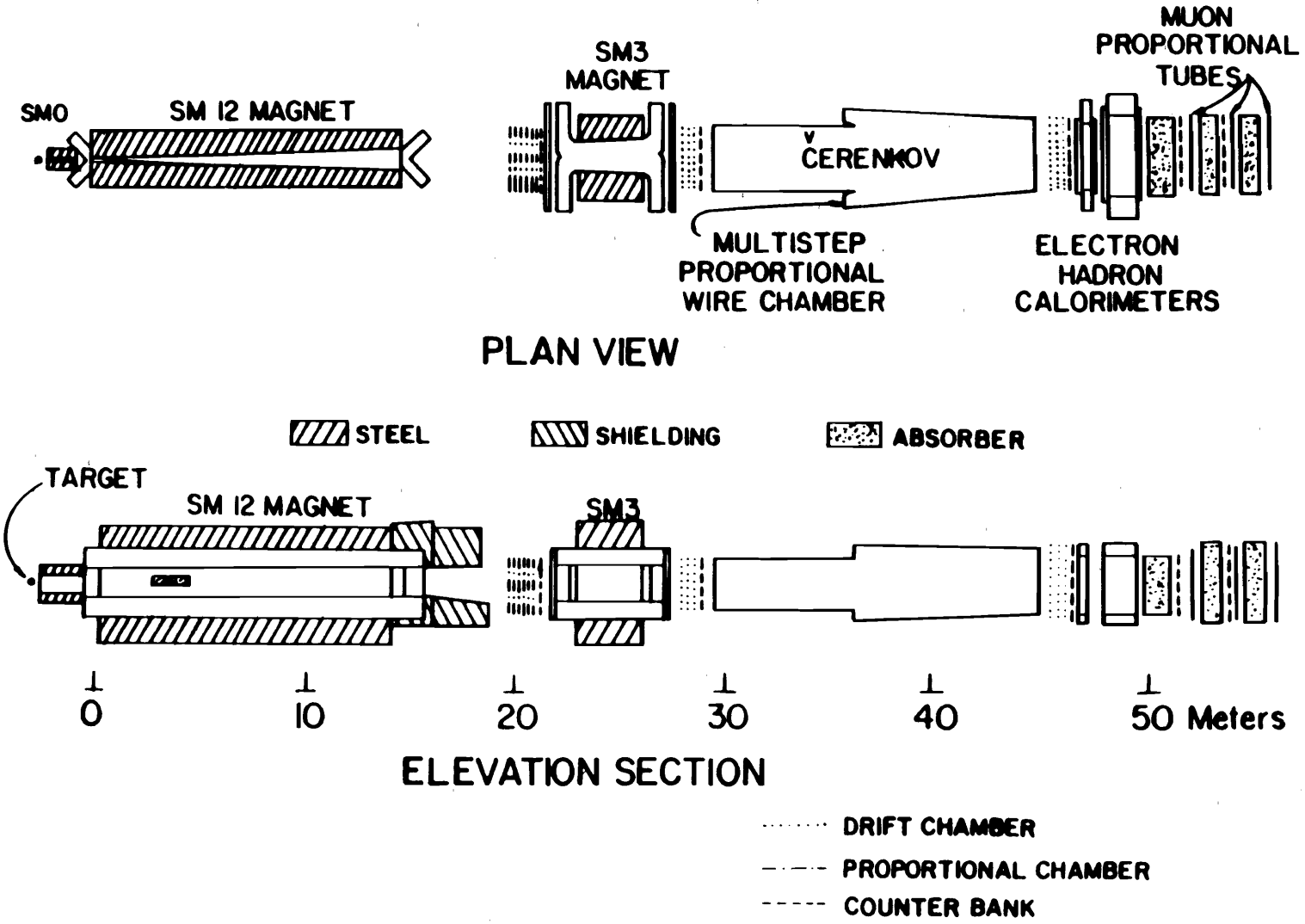
Lambertson Magnet Dogleg and Channeling Crystal Configuration for the SFT Extraction System

E-853 (Murphy) Test of Low Intensity Extraction from the Tevatron Using Channeling in a Bent Crystal

CEBAF, Fermilab, IHEP/Serpukhov (Russia), JINR/Dubna (Russia), New Mexico, PNPI (Russia), SSCL, Texas/Austin, UCLA, Virginia, Wisconsin

Status: *No Data Yet*

We propose to insert a bent crystal at the B-48 location in the Tevatron and extract a low-intensity beam into the abort channel at C0. Our goal is to extract 10^{-6}/sec of the circulating beam (less than 10^6 protons/sec with a circulating beam of 10^{12} protons). An off-momentum halo will be generated, and the extraction rate controlled, by deliberately generated filtered RF noise or RF modulations at discrete frequencies. The experiment tests the feasibility of this technique as an extraction mechanism for the SSC for the SFT B-physics facility described in SSC EOI-14. It will also test the general effectiveness of bent crystals used as halo scrapers for the CDF and D0 experiments. About 100 hours of dedicated Tevatron time are requested to establish the technique, during which only protons need to be circulating.


SM0
SM 12 MAGNET
SM3
MAGNET
CERENKOV
MUON
PROPORTIONAL
TUBES
MULTISTEP
PROPORTIONAL
WIRE CHAMBER
ELECTRON
HADRON
CALORIMETERS
PLAN VIEW
STEEL
SHIELDING
ABSORBER
TARGET
SM 12 MAGNET
SM3
0
10
20
30
40
50 Meters
ELEVATION SECTION
DRIFT CHAMBER
PROPORTIONAL CHAMBER
COUNTER BANK

E-866 (Garvey) Measurement of $\bar{d}(x) / \bar{u}(x)$ in the Proton

Abilene Christian, Academia Sinica / Taiwan (Taiwan), Caltech, Fermilab, Los Alamos, Northern Illinois, Texas A&M

Status: *No Data Yet*

We propose to greatly improve the experimental knowledge of $\bar{d}^p(x) / \bar{u}^p(x)$ via precision measurement of the ratio of Drell-Yan yields from protons on protons to protons on deuterium.

$$\left.\frac{Y_{DY}^{p+p}}{Y_{DY/2}^{p+D}}\right|_{x_f>0.2} \cong 1-\left[\frac{\bar{d}^p(x)-\bar{u}^p(x)}{\bar{d}^p(x)+\bar{u}^p(x)}\right] \qquad (1)$$

In addition to being five times more sensitive than our earlier E-772 measurement on W, it uses the lightest possible nuclei, thereby minimizing any nuclear effects that could obscure extraction of the structure function ratios. The left-hand side of Eq. (1) can be measured as a function of x with experimental systematic errors that will be, at most, ±1.5%. The range in x to be investigated is $0.04 \le x \le 0.3$. The upper limit arises because the sea distribution is a rapidly falling function of x [~ $(1 - x)^8$]. The lower limit arises from the fact that we require the Drell-Yan dilepton pair ($\mu^+\mu^-$) to have a mass appreciably greater (4 GeV) than the mass of the ψ' (3.69 GeV).

The experiment will be carried out using essentially the same equipment as E-772. This setup allowed a high statistics measurement of the ratio of Drell-Yan yields from a variety of nuclear targets. The experimental layout used in E-772 is shown in the figure. The RICH counter will not be used as muons are sufficiently well selected via their range. The three dipoles, SM0, SM12, and SM3, serve as a dimuon spectrometer. The first magnet, SM0, serves to open up the small opening angle of low-mass dimuon pairs, SM12 focuses high p_T muons into the downstream detectors, and both SM12 and SM3 are used to measure the muon momenta. A hadron absorber (e^{-13}) of Cu, C, and CH_2 blocks is placed in the gap of SM12. In this configuration, the apparatus has an energy resolution of 150 MeV at the J/ψ and 200 MeV at the Υ, and z vertex resolution is more than sufficient to reject dimuon pairs created in the beam dump.

In addition to the Drell-Yan data, high-statistics data on J/ψ and ψ' production, as well as a few thousand Υ(1S), Υ(2S) and Υ(3S) events, from H and D targets will also be obtained. The proposed experiment makes use of existing equipment and requires only two months of beam time (one month of setup and checkout, and one month of data-taking).

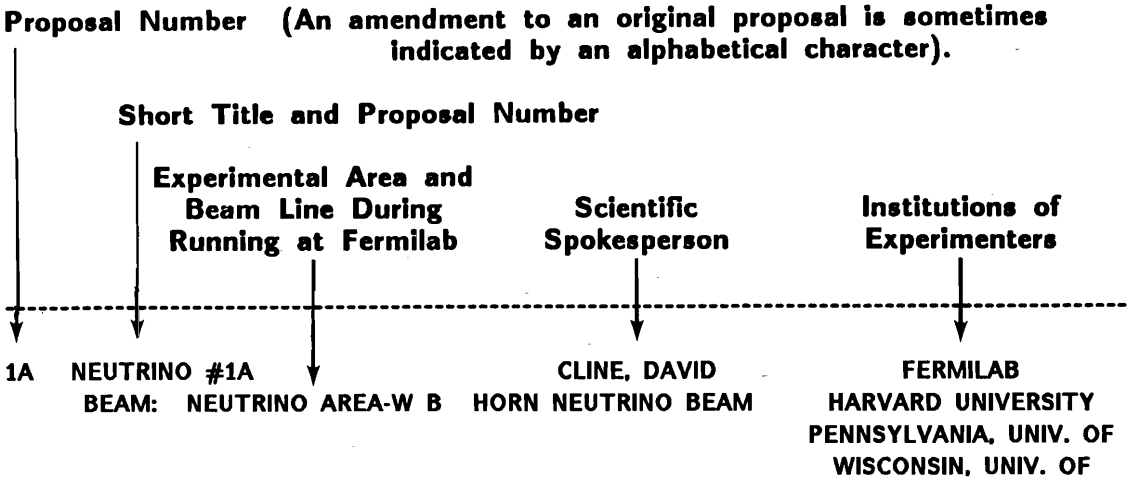
SECTION VIII. MASTER LIST OF PROPOSALS

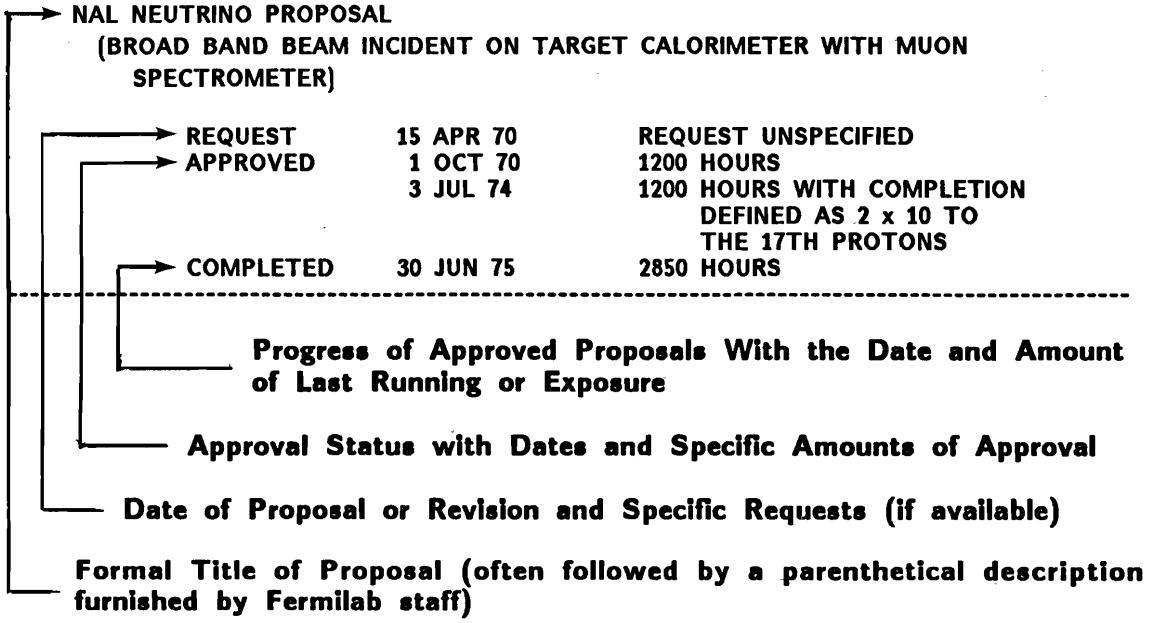
The Master List of proposals contains an entry for each proposal submitted to Fermilab; a typical entry is explained on the next page. In addition to the formal title of the proposal and a brief parenthetical explanation, the name of the spokesperson and a list of participating institutions are included. In the lower part of each entry the specific requests for running time to complete the experiment are listed together with approval action by the Laboratory. For approved proposals only, the amount of running time granted is given together with the current status and extent of beam time used so far.

Most of the information about each proposal stored in the Program Planning Office data file is given in the Master List; lists of proposals shown elsewhere in this Workbook are based on the information contained in the Master List.

For proposals with number below 700, only those which are approved or unconsidered or deferred are listed in the following pages; those with obsolete status (rejected or withdrawn/inactive) are omitted, which explains the gaps in the sequential listing. The complete listing is given starting with proposal 700.

EXPLANATION OF A TYPICAL ENTRY IN THE MASTER LIST





Fermi National Accelerator Laboratory
Master Listing of Proposals as of February 4, 1993

Note: For proposals having a number below 700 only the approved and pending ones are listed.
Total number of proposals - 867 ... Total number of approved & pending proposals - 429

1A NEUTRINO #1A — David B. Cline

FERMILAB
HARVARD UNIVERSITY
UNIVERSITY OF PENNSYLVANIA
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Neutrino Area - Wide Band Horn
NAL NEUTRINO PROPOSAL.
(Broad band beam incident on target calorimeter with muon spectrometer.)

Request	15 Apr, 70	Unspecified	
Approval	1 Oct, 70	1,200 Hours	
	3 Jul, 74	1,200 Hours	with completion of the experiment defined as 20,000 events with 2 x 10 to the 17th protons on a horn-focused beam
Completed	30 Jun, 75	2,850 Hours	

2B 30-INCH HYBRID #2B — Gerald A. Smith

DUKE UNIVERSITY
FERMILAB
IOWA STATE UNIVERSITY
UNIVERSITY OF MARYLAND
MICHIGAN STATE UNIVERSITY
NOTRE DAME UNIVERSITY
PURDUE UNIVERSITY
UNIVERSITY OF TORONTO (CANADA)
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Neutrino Area - 30 in. Hadron Beam
STUDY OF MULTIPARTICLE P-P AND PI ° INTERACTIONS FROM 100 GEV/C TO 400 GEV/C WITH A 30-INCH BUBBLE CHAMBER-OPTICAL SPA K CHAMBER HYBRID SYSTEM.

Request	11 May, 70	Unspecified	but to include an exposure for study of p - p and pi- - p interactions from 75 to 300 GeV	
	29 Apr, 71	500 K Pix		
Approval	1 May, 71	450 K Pix	100K pix of p - p @ 200 GeV	ANL/Fermilab, MSU, ISU, MD
			100K pix of p - p @ 300 GeV)	
			120K pix of pi minus - p @ 200 GeV	Duke, Toronto, Notre Dame
			50K pix of pi minus - p @ 100 GeV)	
			80K pix of pi plus - p @ 100 GeV	Purdue, Wisconsin
Completed	22 Apr, 74	479 K Pix	114K pix of p - p @ 200	
			105K pix of p - p @ 300	
			123K pix of pi- - p @ 200	
			54K pix of pi- - p @ 100	
			83K pix of pi+ - p @ 100	
			bonus pix: 350K pix from #37A, #121A, #125, #137, #138, #141A, #143, #252	

3 MONOPOLE #3 — Philippe Eberhard

LAWRENCE BERKELEY LABORATORY

BEAM: Neutrino Area - Miscellaneous
PROPOSAL FOR A SEARCH FOR MAGNETIC MONOPOLES AT NAL.
(Ferromagnetic target located in a beam dump.)

Request	20 May, 70	Target Exposure(s) to 1 x 10 to 18th protons
Approval	1 Aug, 70	Target Exposure(s)
Completed	4 Sep, 74	4 Targets Exposed

4 NEUTRON CROSS SECTION #4 — Michael J. Longo

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF MICHIGAN

BEAM: Meson Area - M3 Beam
NEUTRON TOTAL CROSS SECTIONS UP TO 300 GEV.
(Total cross sections on H2, D2, heavy nuclei to < 2%.)

Request	20 May, 70	300 Hours	with 100 hours for tune up and 200 hours for data to measure total cross sections
Approval	1 Aug, 70	400 Hours	
Completed	20 Mar, 74	1,450 Hours	

7 ELASTIC SCATTERING #7 — Donald I. Meyer

ARGONNE NATIONAL LABORATORY
FERMILAB
INDIANA UNIVERSITY
UNIVERSITY OF MICHIGAN

BEAM: Meson Area - M1 Beam
PROPOSAL TO MEASURE PI+(-) - P AND P-P DIFFERENTIAL ELASTIC SCATTERING CROSS SECTIONS FROM 50 TO 170 GEV/C.
(In addition, data will be taken on K+(-) - p and pbar - p simultaneously; t from 0.1 - 2.0 or 3.0.)

Request	10 Jun, 70	1,600 Hours
Approval	1 Aug, 70	800 Hours
Completed	28 Jan, 75	2,350 Hours

8 NEUTRAL HYPERON #8 — Lee G. Pondrom

UNIVERSITY OF MICHIGAN
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M2 Beam
EXPERIMENTS IN A NEUTRAL HYPERON BEAM.
(Beam survey, delta s = 2 decay search, and lambda - p scattering.)

Request	12 Jun, 70	260 Hours for data
Approval	1 Aug, 70	400 Hours
Completed	22 Mar, 76	2,450 Hours

12 NEUTRON BACKWARD SCATTERING #12 — Neville W. Reay

CARELTON UNIVERSITY (CANADA)
MICHIGAN STATE UNIVERSITY
OHIO STATE UNIVERSITY

BEAM: Meson Area - M3 Beam
A STUDY OF NEUTRON-PROTON CHARGE-EXCHANGE SCATTERING IN THE MOMENTUM RANGE 50-300 GEV/C.
(u from 0.002 - 1.0.)

Request	15 Jun, 70	760 Hours
Approval	1 Aug, 70	600 Hours with priority lower than exp #4
Completed	2 Dec, 74	1,300 Hours

14A PROTON-PROTON INELASTIC #14A — Paolo Franzini

COLUMBIA UNIVERSITY
SUNY AT STONY BROOK

BEAM: Neutrino Area - Miscellaneous
PROPOSAL TO STUDY INELASTIC HIGH-ENERGY PROTON-PROTON COLLISIONS IN THE DIFFRACTIVE REGION.
(t from 0.001 - 0.07 and missing mass to 10 GeV.)

Request	15 Jun, 70	200 Hours
Approval	1 Mar, 71	150 Hours with low priority
Completed	21 Jun, 73	140 Hours

21A NEUTRINO #21A — Barry C. Barish

CALIFORNIA INSTITUTE OF TECHNOLOGY
FERMILAB

BEAM: Neutrino Area - Dichromatic
NEUTRINO PHYSICS AT VERY HIGH ENERGIES.
(Dichromatic beam incident on target calorimeter with muon spectrometer.)

Request	15 Jun, 70	750 Hours	
Approval	1 Aug, 70	1,200 Hours	
	26 Jun, 74	1,200 Hours	with the inclination for the completion of exp# 21A (approximately 400 hours) to have a lower priority than running for exp# 320
	11 Nov, 74	1,200 Hours	with remaining running to be coordinated with exp# 254
Completed	2 Nov, 75	2,450 Hours	

Fermi National Accelerator Laboratory
Master Listing of Proposals as of February 4, 1993

(continued)

22 MULTIGAMMA #22 — George B. Collins

BROOKHAVEN NATIONAL LABORATORY
VIRGINIA POLYTECHNIC INSTITUTE

BEAM: Meson Area - M2 Beam
EXPERIMENTAL PROPOSAL TO THE NATIONAL ACCELERATOR LABORATORY FOR A SEARCH FOR MULTIGAMMA EVENTS FROM MAGNETIC MONOPOLE PAIRS.

Request	15 Jun, 70	100 Hours	for data
Approval	1 Aug, 70	200 Hours	for hadron beam use only
Completed	26 Jun, 74	350 Hours	

25A PHOTON TOTAL CROSS SECTION #25A — David O. Caldwell

UNIV. OF CALIFORNIA, SANTA BARBARA
FERMILAB
LEBEDEV PHYSICAL INST. (RUSSIA)
UNIVERSITY OF TORONTO (CANADA)

BEAM: Proton Area - East
MEASUREMENT OF THE TOTAL PHOTOABSORPTION CROSS SECTION ON H, D, C, CU, AND PB FOR PHOTON ENERGIES FROM 14 TO 300 GEV, AND A SEARCH FOR THE PHOTOPRODUCED MONOPOLE.

Request	15 Jun, 70	400 Hours	for data
Approval	1 Aug, 71	600 Hours	with 200 hours for tuning, 400 hours for data
	26 Oct, 76	1,000 Hours	with additional 400 hours for the experiment to continue data taking until 30 Nov 1976
Completed	30 Nov, 76	1,850 Hours	

26 MUON #26 — Louis N. Hand

UNIV. OF CALIFORNIA, SAN DIEGO
CORNELL UNIVERSITY
LAWRENCE BERKELEY LABORATORY
MICHIGAN STATE UNIVERSITY

BEAM: Neutrino Area - Muon/Hadron Beam
HIGH MOMENTUM TRANSFER INELASTIC MUON SCATTERING AND TEST OF SCALE INVARIANCE AT NAL.

Request	15 Jun, 70	Unspecified	
Approval	1 Aug, 70	500 Hours	
	6 Aug, 73	500 Hours	defined as 3 x 10 to the 17th protons
Completed	16 Apr, 74	900 Hours	

27A NEUTRON DISSOCIATION #27A — Jerome L. Rosen

FERMILAB
UNIVERSITY OF MASSACHUSETTS
NORTHWESTERN UNIVERSITY
UNIVERSITY OF ROCHESTER

BEAM: Meson Area - M3 Beam
PROPOSAL TO STUDY THE COHERENT DISSOCIATION OF NEUTRONS.

Request	15 Jun, 70	Unspecified	
Approval	1 Mar, 71	200 Hours	for low priority Stage I running
Completed	24 Apr, 74	850 Hours	

28A 15-FOOT NEUTRINO/H2&NE #28A — William F. Fry

CERN (SWITZERLAND)
UNIVERSITY OF HAWAII AT MANOA
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Neutrino Area - Wide Band Horn
SEARCH FOR HEAVY LEPTONS AND HARD PENETRATING RADIATION IN THE NEUTRINO BEAM; STUDY DIFFRACTION SCATTERING OF NEUTRINOS AND DEEP INELASTIC MUON-NEUTRINO SCATTERING IN A NEON BUBBLE CHAMBER AT NAL; TEST OF DELTA S=DELTA Q RULE ∂ HIGH MOMENTUM

Request	15 Jun, 70	1,000 K Pix	to include 500K pix with the primary protons incident on the hadron shield and 500K pix with normal targetry
Approval	1 Dec, 71	100 K Pix	with 50K pix of neutrinos in neon (greater than or equal to 30%) with the constraint that running conditions yield at least 10,000 events; and 50K pix of neutrinos using special targeting
	9 May, 75	100 K Pix	total of neutrinos in the 22% neon mixture under horn focusing conditions
Completed	11 Jun, 75	97 K Pix	

31A 15-FOOT ANTI-NEUTRINO/H2 #31A — Malcolm Derrick

ARGONNE NATIONAL LABORATORY
CARNEGIE-MELLON UNIVERSITY
PURDUE UNIVERSITY

BEAM: Neutrino Area - Wide Band Horn
PROPOSAL TO INVESTIGATE MUON-ANTINEUTRINO INTERACTIONS IN HYDROGEN AT NAL.

Request	15 Jun, 70	1,000 K Pix	requiring a total exposure of 10 to the 19th protons with 10 to the 13th protons per pulse on target
Approval	1 Dec, 71	200 K Pix	maximum with the constraint that the running conditions yield at least 7,000 antineutrino interactions
Completed	13 Aug, 77	211 K Pix	

34 DETECTOR DEVELOPMENT #34 — Richard W. Huggett

LOUISIANA STATE UNIVERSITY
MAX-PLANCK INSTITUTE (GERMANY)

BEAM: Neutrino Area - Miscellaneous
NUCLEAR-ELECTROMAGNETIC CASCADE DEVELOPMENT STUDY.
(Ionization spectrometer development.)

Request	15 Jun, 70	400 Hours	in two calibration runs
Approval	1 Aug, 70	Parasitic Running	
Completed	26 Jun, 74	50 Hours	

36A PROTON-PROTON SCATTERING #36A — Rodney L. Cool

FERMILAB
JINR, DUBNA (RUSSIA)
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY

BEAM: Internal Target Area (C-0)
A PROPOSAL TO STUDY SMALL ANGLE P-P SCATTERING AT VERY HIGH ENERGIES.
(Using a gas jet target and the internal proton beam.)

Request	15 Jun, 70	550 Hours	
Approval	1 Feb, 71	500 Hours	
Completed	24 Jun, 73	700 Hours	

37A 30-INCH P-P @ 300 #37A — Ernest I. Malamud

CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIV. OF CALIFORNIA, LOS ANGELES
FERMILAB
INDIANA UNIVERSITY

BEAM: Neutrino Area - 30 in. Hadron Beam
MULTIBODY FINAL STATES IN PP COLLISIONS UP TO 500 GEV.

Request	15 Jun, 70	250 K Pix	of p - p interactions at 100,200,300,400,500 GeV in 15-foot chamber
	3 May, 71	100 K Pix	of p - p interactions at one fixed high energy in 30-inch chamber
Approval	26 Aug, 71	50 K Pix	in bare chamber with events where there is downstream spark chamber data to be shared with exp #2B
Completed	1 Jun, 73	51 K Pix	

45A 15-FOOT NEUTRINO/H2 #45A — Frank A. Nezrick

FERMILAB
UNIVERSITY OF HAWAII AT MANOA
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF MICHIGAN

BEAM: Neutrino Area - Wide Band Horn
PROPOSAL TO STUDY NEUTRINO INTERACTIONS WITH PROTONS USING THE 15-FOOT BUBBLE CHAMBER AT NAL.

Request	15 Jun, 70	200 K Pix	with 10 to the 13th protons/pulse of at least 200 GeV
	19 Jul, 71	500 K Pix	with 10 to the 13th protons/pulse at 350 GeV
Approval	17 Dec, 71	300 K Pix	maximum with the constraint that the running conditions yield on the order of 15,000 events of neutrinos in hydrogen
Completed	13 Jan, 76	162 K Pix	

48 MUON SEARCH #48 — Robert K. Adair

BROOKHAVEN NATIONAL LABORATORY
FERMILAB
YALE UNIVERSITY

BEAM: Proton Area - Center
A MEASUREMENT OF THE INTENSITY AND POLARIZATION OF MUONS PRODUCED DIRECTLY BY THE INTERACTIONS OF PROTONS WITH NUCLEI.

Request	15 Jun, 70	200 Hours	
Approval	1 Dec, 70	200 Hours	for an exploratory experiment
Completed	1 Dec, 75	500 Hours	

Fermi National Accelerator Laboratory
Master Listing of Proposals as of February 4, 1993

(continued)

51A MISSING MASS #51A — Eberhard Von Goeler

NORTHEASTERN UNIVERSITY

BEAM: Meson Area - M2 Beam
MASS SPECTRA AND DECAY MODES FOR HADRONS WITH MASSES UP TO 15 GEV.

Request	15 Jun, 70	850 Hours
Approval	14 Aug, 73	300 Hours with low priority
Completed	23 Oct, 74	800 Hours

53A 15-FOOT NEUTRINO/H2&NE #53A — Charles Baltay

BROOKHAVEN NATIONAL LABORATORY
COLUMBIA UNIVERSITY

BEAM: Neutrino Area - Wide Band Horn
SEARCH FOR THE INTERMEDIATE BOSON, LEPTON PAIR PRODUCTION, AND A STUDY OF DEEPLY INELASTIC REACTIONS UTILIZING HIGH ENERGY NEUTRINO INTERACTIONS IN LIQUID NEON.

Request	15 Jun, 70	1,000 K Pix of neutrino interactions in 15-foot with 70% neon and 30% deuterium and with inserted plate
	6 Jul, 71	1,000 K Pix with 900K pix of neutrino interactions in neon with single plate and 100K pix in hydrogen with two plates
	16 Jun, 76	200 K Pix requested increase of the approved picture total from 100K to 200K
	25 Jan, 78	450 K Pix to include an increase of 300K beyond the approximately 150K pix presently available for the experiment; at least 150K pix additional are requested during the summer or fall of 1978
	19 Jun, 78	450 K Pix to include an increase of 300K pix; this follows rejection of the
Approval	17 Dec, 71	100 K Pix in neon or plates to yield at least 20,000 events total including
	29 Jun, 76	150 K Pix total including about 50K pix already taken
	28 Jun, 78	450 K Pix total including an extension for 300K pix
Completed	9 Mar, 81	440 K Pix

61 POLARIZED SCATTERING #61 — Owen Chamberlain

ARGONNE NATIONAL LABORATORY
FERMILAB
HARVARD UNIVERSITY
LAWRENCE BERKELEY LABORATORY
SUFFOLK UNIVERSITY
YALE UNIVERSITY

BEAM: Meson Area - M1 Beam
A PROPOSAL TO MEASURE POLARIZATION IN P P, PI- P, AND PI+ P ELASTIC SCATTERING AT 50, 100, AND 150 GEV/C.

Request	15 Jun, 70	1,100 Hours for setup, tests, and data
	10 Mar, 77	1,600 Hours to include additional time for 4 weeks of data at 300 GeV and 1 week at 100 GeV; running requires accelerator operation at those energies
Approval	1 Aug, 70	800 Hours
	24 Jun, 77	1,200 Hours with an attempt to provide 300 GeV data under the condition that the running not interfere with other major laboratory programs
Completed	26 Oct, 77	1,900 Hours

63A PHOTON SEARCH #63A — James K. Walker

FERMILAB
UNIVERSITY OF HAWAII AT MANOA
NORTHERN ILLINOIS UNIVERSITY

BEAM: Internal Target Area (C-0)
SURVEY OF PARTICLE PRODUCTION IN PROTON COLLISIONS AT NAL.
(Photon production in proton collisions at the Internal Target Area; see also exp #284.)

Request	15 Jun, 70	Unspecified
Approval	17 Dec, 70	400 Hours
	19 Oct, 73	400 Hours with understanding that additional photon production data would be taken at 60, 50, 40, 30, and 20 mrads
Completed	13 Mar, 75	2,600 Hours

67A PROTON-PROTON MISSING MASS #67A — Felix Sannes

FLORIDA STATE UNIVERSITY
RUTGERS UNIVERSITY
UPSALA COLLEGE

BEAM: Internal Target Area (C-0)
SEARCH FOR BARYON RESONANCES UP TO 10 GEV MASS PRODUCED IN P + P TO P + MM WITH A RESOLUTION OF + OR - 25 MEV.
(Using a gas jet target and the internal proton beam.)

Request	15 Jun, 70	Unspecified
Approval	1 Feb, 71	100 Hours
Completed	8 Aug, 73	600 Hours

69A ELASTIC SCATTERING #69A — Joseph Lach

FERMILAB
RUTHERFORD-APPLETON LABS.(ENGLAND)
YALE UNIVERSITY

BEAM: Meson Area - M6 Beam
ELASTIC SCATTERING OF THE LONG-LIVED HADRONS.
(Small angle scattering to t of 0.2 and coulomb interference.)

Request	15 Jun, 70	380 Hours of 'ideal time' to make coulomb interference measurements with stable particles and diffraction peak measurements with hyperons
	1 Dec, 70	180 Hours of 'ideal time' to make coulomb interference measurements with stable particles; also see exp# 97 and 497
Approval	15 Sep, 70	600 Hours
Completed	3 Mar, 76	2,800 Hours

70 LEPTON #70 — Leon M. Lederman

COLUMBIA UNIVERSITY
FERMILAB

BEAM: Proton Area - Center
STUDY OF LEPTON PAIRS FROM PROTON-NUCLEAR INTERACTIONS; SEARCH FOR INTERMEDIATE BOSONS AND LEE-WICK STRUCTURE.

Request	23 Jun, 70	2,800 Hours to include about 1,700 hours for study of single lepton production and 1,100 hours for study of lepton pairs
Approval	1 Dec, 70	600 Hours
Completed	1 Dec, 74	2,800 Hours

72 QUARK #72 — Lawrence B. Leipuner

BROOKHAVEN NATIONAL LABORATORY
YALE UNIVERSITY

BEAM: Meson Area - M4 Beam
EXPERIMENTAL PROPOSAL TO NAL -- QUARK SEARCH.
(By measuring ionization energy loss.)

Request	15 Jun, 70	100 Hours for data taking
Approval	1 Aug, 70	200 Hours
Completed	11 Jun, 73	500 Hours

75 QUARK #75 — Taiji Yamanouchi

FERMILAB
NEW YORK UNIVERSITY

BEAM: Meson Area - M2 Beam
A PROPOSAL TO SEARCH FOR FRACTIONALLY CHARGED QUARKS.
(Measurement of ionization and total energy of fractionally charged particles using momentum selection.)

Request	29 Jun, 70	200 Hours for tests and data taking
Approval	1 Sep, 70	200 Hours
Completed	8 Sep, 73	1,050 Hours

76 MONOPOLE #76 — Richard A. Carrigan

FERMILAB

BEAM: Neutrino Area - Miscellaneous
SEARCH FOR MAGNETIC MONOPOLES PRODUCED AT NAL.
(Employing a beam-dump target.)

Request	15 Jun, 70	Parasitic Running
Approval	1 Sep, 70	Target Exposure(s) with parasitic running
Completed	1 Dec, 74	5 Targets Exposed

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81A NUCLEAR CHEMISTRY #81A — **Sheldon Kaufman**

BEAM: Meson Area - Miscellaneous
PRELIMINARY SURVEY OF 200 GEV PROTON INTERACTIONS WITH COMPLEX NUCLEI.
(Nuclear chemistry analysis.)

ARGONNE NATIONAL LABORATORY
BROOKHAVEN NATIONAL LABORATORY
CARNEGIE-MELLON UNIVERSITY
UNIVERSITY OF CHICAGO
UNIV. OF ILLINOIS, CHICAGO CIRCLE
PURDUE UNIVERSITY
RBL, ORSAY (FRANCE)

Request	9 Jul, 70	Parasitic Running
Approval	1 Aug, 70	Target Exposure(s)
Completed	1 Oct, 78	197 Bombardment(s)

82 K ZERO REGENERATION #82 — **Valentine L. Telegdi**

BEAM: Meson Area - M4 Beam
PROPOSAL TO INVESTIGATE REGENERATION OF NEUTRAL K-MESONS AT VERY HIGH ENERGIES.
(See exp #425.)

UNIV. OF CALIFORNIA, SAN DIEGO
UNIVERSITY OF CHICAGO
SLAC
UNIVERSITY OF WISCONSIN-MADISON

Request	13 Jul, 70	1,000 Hours for preliminary run and data taking
Approval	15 Sep, 70	800 Hours
	22 Nov, 74	1,100 Hours total including additional 300 hours with complex nuclear targets
Completed	5 Jul, 75	3,500 Hours

86A PION DISSOCIATION #86A — **Henry J. Lubatti**

BEAM: Meson Area - M1 Beam
A PROPOSAL TO STUDY INELASTIC DIFFRACTIVE PROCESSES BY OBSERVING COHERENT PRODUCTION OF MULTI-PION FINAL STATES FROM HE NUCLEI.
(Using a streamer chamber.)

LAL, ORSAY (FRANCE)
UNIVERSITY OF WASHINGTON

Request	24 Jul, 70	1,050 Hours for setup, tests and data taking
Approval	28 May, 71	800 Hours with low priority
Completed	22 Mar, 76	800 Hours

87A PHOTOPRODUCTION #87A — **Thomas O'Halloran**

BEAM: Proton Area - East
PROPOSAL TO SEARCH FOR HEAVY LEPTONS AND INTERMEDIATE BOSONS FROM PHOTON-NUCLEON AND PHOTON-NUCLEI COLLISIONS.

COLUMBIA UNIVERSITY
FERMILAB
UNIVERSITY OF HAWAII AT MANOA
UNIVERSITY OF ILLINOIS, CHAMPAIGN

Request	30 Jul, 70	Unspecified
	25 Feb, 71	4,400 Hours for setup, tests, and data taking
Approval	1 Aug, 71	600 Hours
	13 Nov, 75	1,100 Hours with an extension of 500 hours of data taking
	28 Jul, 77	3,100 Hours with an additional 2,000 hours for study of charmed baryon production
Completed	7 May, 78	4,800 Hours

90 EMULSION/PROTONS @ 200 #90 — **Wladyslaw Wolter**

BEAM: Meson Area - Miscellaneous
CRACOW NUCLEAR EMULSION EXPOSURES.

INP, KRAKOW (POLAND)

Request	23 Jun, 70	Emulsion Exposure
Approval	1 Aug, 70	Emulsion Exposure
Completed	20 Sep, 72	4 Stack(s)

95A PHOTON SEARCH #95A — **Bradley B. Cox**

BEAM: Proton Area - West
PROPOSAL FOR EXAMINATION OF WIDE ANGLE GAMMA RAYS AT NAL.
(Single and digamma production by proton-nucleon collisions.)

FERMILAB
JOHNS HOPKINS UNIVERSITY

Request	26 Oct, 70	100 Hours of data taking with parasitic beam used for setup
	12 Oct, 76	3,100 Hours for further study of diphoton spectra
Approval	1 Jun, 71	400 Hours
	5 Jan, 77	1,650 Hours with an extension in an effort to approach the 12.5 weeks of running which was requested
	12 Sep, 77	1,950 Hours with approval of an additional 3 weeks of running at 200/300 GeV
Completed	17 Oct, 77	3,400 Hours

96 ELASTIC SCATTERING #96 — **David Ritson**

BEAM: Meson Area - M6 Beam
FOCUSING SPECTROMETER FACILITY.
(Measure elastic scattering and quasi elastic scattering of pi+(-), K+(-), p+(-) on H2 and D2 up to 200 GeV/c with t up to 1.5.)

ARGONNE NATIONAL LABORATORY
UNIVERSITY OF BARI (ITALY)
BROWN UNIVERSITY
CERN (SWITZERLAND)
CORNELL UNIVERSITY
FERMILAB
MASSACHUSETTS INST. OF TECHNOLOGY
NORTHEASTERN UNIVERSITY
STANFORD UNIVERSITY

Request	3 Dec, 70	1,000 Hours for check out and data taking
Approval	1 Dec, 70	800 Hours
Completed	17 Feb, 75	2,550 Hours

98 MUON #98 — **Herbert L. Anderson**

BEAM: Neutrino Area - Muon/Hadron Beam
MUON-PROTON INELASTIC SCATTERING EXPERIMENT AT THE NATIONAL ACCELERATOR LABORATORY.
(Using a large aperture magnet to detect scattered muons and charged hadrons.)

UNIVERSITY OF CHICAGO
HARVARD UNIVERSITY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
UNIVERSITY OF OXFORD (ENGLAND)

Request	2 Dec, 70	1,600 Hours for tests and data taking
Approval	19 Jan, 71	400 Hours of initial running with H2 (100 hours of parasitic testing)
	6 Aug, 73	400 Hours with approval for both D2 and H2
	26 Jun, 74	800 Hours with additional 400 hours for data taking
Completed	17 Feb, 75	1,800 Hours

99 ASSOCIATED PRODUCTION #99 — **Robert E. Diebold**

BEAM: Meson Area - M6 Beam
A STUDY OF PI+ P TO K+ SIGMA+ AND PI+ P TO K+ Y-STAR+ USING THE FOCUSING SPECTROMETER FACILITY.
(Incident momenta from 20 - 120 GeV/c, t from 0.04 - 0.6.)

ARGONNE NATIONAL LABORATORY
FERMILAB
SLAC
STANFORD UNIVERSITY

Request	3 Dec, 70	500 Hours for tests and data taking
Approval	25 Nov, 74	500 Hours
Completed	24 Jan, 78	750 Hours

100A PARTICLE SEARCH #100A — **Pierre A. Piroue**

BEAM: Proton Area - East
A PROPOSAL TO STUDY PARTICLE PRODUCTION AT HIGH TRANSVERSE MOMENTA.
(Measurement of particle production at 90 degrees in c.m. from proton interactions with nuclei.)

UNIVERSITY OF CHICAGO
PRINCETON UNIVERSITY

Request	4 Dec, 70	500 Hours for data taking
Approval	1 Feb, 71	500 Hours
Completed	4 Apr, 74	1,150 Hours

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103 EMULSION/PROTONS @ 200 #103 — **David T. King**

UNIVERSITY OF TENNESSEE, KNOXVILLE

BEAM: Meson Area - Miscellaneous
INTRA-NUCLEAR CASCADE PRODUCED BY 200 GEV PROTONS.

Request	21 Dec, 70	Emulsion Exposure	
Approval	1 Feb, 71	Emulsion Exposure	
Completed	20 Sep, 72	1 Stack(s)	

104 TOTAL CROSS SECTION #104 — **Thaddeus F. Kycia**

BROOKHAVEN NATIONAL LABORATORY
FERMILAB
MAX-PLANCK INSTITUTE (GERMANY)
ROCKEFELLER UNIVERSITY
UNIVERSITY OF WASHINGTON

BEAM: Meson Area - M1 Beam
MEASUREMENT OF TOTAL CROSS SECTIONS ON HYDROGEN AND DEUTERIUM.
(Of pi+-, K+-, p, pbar.)

Request	8 Jan, 71	700 Hours	for tests and data taking
	16 Jun, 76	1,300 Hours	total with additional 600 hours for completion of cross section data and particle search exp# 354
Approval	8 Mar, 71	700 Hours	
	29 Jun, 76	1,300 Hours	including an additional 600 hours for the remainder of exp# 104 and exp# 354
Completed	22 Dec, 77	2,650 Hours	

105 EMULSION/PROTONS @ 200 #105 — **Prince K. Malhotra**

JAMMU UNIVERSITY (INDIA)
PANJAB UNIVERSITY (INDIA)
TATA INSTITUTE (INDIA)

BEAM: Meson Area - Miscellaneous
A PROPOSAL TO STUDY SOME CHARACTERISTICS OF PROTON-NUCLEON AND PROTON-NUCLEUS COLLISIONS AT 400 GEV USING NUCLEAR EMULSIONS.

Request	14 Jan, 71	Emulsion Exposure	
Approval	1 Apr, 71	Emulsion Exposure	
Completed	20 Sep, 72	1 Stack(s)	

108 BEAM DUMP #108 — **Miguel Awschalom**

FERMILAB

BEAM: Meson Area - M2 Beam
A BEAM DUMP EXPERIMENT.
(Study of shielding including hadron cascade development, muon attenuation, radioactivity.)

Request	4 Feb, 71	40 Hours	for irradiation
Approval	1 Mar, 71	40 Hours	
Completed	2 Jun, 75	350 Hours	

110A MULTIPARTICLE #110A — **Alexander R. Dzierba**

CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIV. OF CALIFORNIA, LOS ANGELES
FERMILAB
UNIV. OF ILLINOIS, CHICAGO CIRCLE
INDIANA UNIVERSITY
MAX-PLANCK INSTITUTE (GERMANY)

BEAM: Meson Area - M6 Beam
PROPOSAL TO STUDY MULTIPARTICLE PERIPHERAL PHYSICS AT NAL.
(Using a large wire chamber magnetic spectrometer.)

Request	15 Feb, 71	400 Hours	for test run and overview
	10 Aug, 72	900 Hours	for tests and data taking
	21 Oct, 76	900 Hours	for data taking
Approval	5 Apr, 72	800 Hours	
	16 Nov, 73	600 Hours	with understanding that approximately 200 hours of previously approved 800 hours of running will be used for exp# 260
	18 Nov, 76	1,000 Hours	with expectation that 800 hours will be used for data taking and 2 weeks for tuneup of beam and equipment
Completed	9 Apr, 78	1,600 Hours	

111 PION CHARGE EXCHANGE #111 — **Alvin V. Tollestrup**

CALIFORNIA INSTITUTE OF TECHNOLOGY
LAWRENCE BERKELEY LABORATORY

BEAM: Meson Area - M2 Beam
PROPOSAL TO STUDY PI- P TO PI0 N AND PI- P TO ETA N AT HIGH ENERGY.

Request	15 Feb, 71	450 Hours	for tests and data taking
Approval	1 Feb, 71	400 Hours	
Completed	19 Sep, 74	1,800 Hours	

114 EMULSION/PROTONS @ 200 #114 — **Piyare L. Jain**

SUNY AT BUFFALO

BEAM: Meson Area - Miscellaneous
STUDY OF 200-500 GEV PROTON AND PION INTERACTION WITH NUCLEAR EMULSION.

Request	24 Feb, 71	Emulsion Exposure	
Approval	1 Mar, 72	Emulsion Exposure	
Completed	20 Sep, 72	1 Stack(s)	

115 LONG-LIVED PARTICLES #115 — **M. Lynn Stevenson**

LAWRENCE BERKELEY LABORATORY

BEAM: Neutrino Area - Miscellaneous
SEARCH FOR LONG-LIVED PARTICLES
(Tau greater than or approximately equal 0.1 msec; analysis of particles from a beam dump.)

Request	1 Mar, 71	Parasitic Running	
Approval	26 Aug, 71	Parasitic Running	
Completed	23 Nov, 74	6 Hours	

116 EMULSION/PROTONS @ 200 #116 — **Jacques D. Hebert**

UNIVERSITY OF BARCELONA (SPAIN)
CRN, STRASBOURG (FRANCE)
FERMILAB
UNIVERSITY OF LYON (FRANCE)
MCGILL UNIVERSITY (CANADA)
UNIVERSITY OF MONTREAL (CANADA)
UNIVERSITY OF OTTAWA (CANADA)
UNIVERSITY OF VALENCIA (SPAIN)

BEAM: Meson Area - Miscellaneous
INTERACTION OF HIGH ENERGY PROTONS IN NUCLEAR EMULSIONS LOADED WITH B 10 AND LIF.

Request	31 Mar, 71	Emulsion Exposure	
Approval	1 Apr, 71	Emulsion Exposure	
Completed	20 Sep, 72	5 Stack(s)	

117A EMULSION/PROTONS @ 200 #117A — **Osamu Kusumoto**

KINKI UNIVERSITY (JAPAN)
KOBE UNIVERSITY (JAPAN)
OSAKA CITY UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)
WAKAYAMA MEDICAL COLLEGE (JAPAN)

BEAM: Meson Area - Miscellaneous
PHENOMOLOGICAL STUDY OF 200 AND 500 GEV/C PROTON-PROTON COLLISIONS IN EMULSION.

Request	2 Mar, 71	Emulsion Exposure	
Approval	1 Apr, 71	Emulsion Exposure	
Completed	20 Sep, 72	11 Stack(s)	

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118A INCLUSIVE SCATTERING #118A — George W. Brandenburg

UNIVERSITY OF BARI (ITALY)
BROWN UNIVERSITY
FERMILAB
MASSACHUSETTS INST. OF TECHNOLOGY

BEAM: Meson Area - M6 Beam
HADRON SPECTRA FROM HIGH ENERGY INTERACTIONS.
(Single particle inclusive spectra from pions, kaons, and protons using single arm spectrometer.)

Request	3 Mar, 71	950 Hours	for tests and data taking
	20 Jun, 73	1,200 Hours	total with additional 250 hours of data taking
	22 Oct, 76	950 Hours	with an additional 350 hours to extend existing measurements; see proposal #513
Approval	25 Nov, 74	600 Hours	
	18 Nov, 76	950 Hours	with additional 350 hours for continued data taking
Completed	20 Jul, 77	2,550 Hours	

120 PHOTON SEARCH #120 — David B. Cline

UNIVERSITY OF CHICAGO
HARVARD UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Internal Target Area (C-0)
EARLY PI ZERO PARTICLE PRODUCTION SURVEY WITH THE GAS JET TARGET.
(Also direct photon production using the internal proton beam.)

Request	9 Mar, 71	Unspecified	
Approval	1 Jun, 71	200 Hours	
Completed	29 May, 73	1,200 Hours	

121A 30-INCH PI+ & P - P @ 100 #121A — Richard L. Lander

UNIV. OF CALIFORNIA, DAVIS
LAWRENCE BERKELEY LABORATORY

BEAM: Neutrino Area - 30 in. Hadron Beam
A PROPOSAL TO SEARCH FOR VERY HEAVY STRANGE PARTICLES USING A SMALL HYDROGEN BUBBLE CHAMBER.

Request	11 Mar, 71	100 K Pix	
	17 May, 71	200 K Pix	total with 50K at each of four incident proton momenta, 100, 200, 300, and 400 GeV/c
Approval	26 Aug, 71	50 K Pix	in bare chamber with events where there is downstream spark chamber data to be shared with exp #2B
Completed	23 Jan, 74	104 K Pix	

125 30-INCH PI- - P @ 100 #125 — Douglas R. O. Morrison

CERN (SWITZERLAND)

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL TO STUDY PI- P REACTIONS AT 60 AND 200 GEV/C IN THE 30-INCH.

Request	7 May, 71	100 K Pix	
Approval	27 Aug, 71	50 K Pix	in bare chamber with events where there is downstream spark chamber data to be shared with exp #2B
Completed	28 Aug, 73	53 K Pix	

137 30-INCH PI- - P @ 200 #137 — Fred Russ Huson

UNIV. OF CALIFORNIA, BERKELEY
FERMILAB
LAWRENCE BERKELEY LABORATORY

BEAM: Neutrino Area - 30 in. Hadron Beam
STUDY OF PI- + P INTERACTIONS AT HIGH ENERGY.

Request	4 May, 71	50 K Pix	
Approval	26 Aug, 71	50 K Pix	in bare chamber with events where there is downstream spark chamber data to be shared with exp #2B
Completed	10 Mar, 73	48 K Pix	

138 30-INCH P-P @ 400 #138 — Jack C. Vander Velde

UNIVERSITY OF MICHIGAN
UNIVERSITY OF ROCHESTER

BEAM: Neutrino Area - 30 in. Hadron Beam
STUDY OF MULTIPARTICLE PRODUCTION IN A 30-INCH BUBBLE CHAMBER.

Request	10 May, 71	240 K Pix	total; combined experiment from proposals #62 and #80
Approval	26 Aug, 71	50 K Pix	in bare chamber with events where there is downstream spark chamber data to be shared with exp #2B
Completed	26 Aug, 75	52 K Pix	

141A 30-INCH P-P @ 200 #141A — Thomas H. Fields

ARGONNE NATIONAL LABORATORY
FERMILAB
IOWA STATE UNIVERSITY
UNIVERSITY OF MARYLAND
MICHIGAN STATE UNIVERSITY

BEAM: Neutrino Area - 30 in. Hadron Beam
STUDY OF PP INTERACTIONS IN THE ANL 30-INCH HYDROGEN BUBBLE CHAMBER AT NAL.

Request	25 Jun, 71	50 K Pix	
Approval	26 Aug, 71	50 K Pix	in bare chamber with events where there is downstream spark chamber data to be shared with exp #2B
Completed	27 Nov, 72	67 K Pix	

142 SUPER-HEAVY ELEMENTS #142 — Raymond W. Stoughton

ARGONNE NATIONAL LABORATORY
OAK RIDGE NATIONAL LABORATORY

BEAM: Neutrino Area - Miscellaneous
PROPOSAL FOR A SEARCH FOR SUPERHEAVY ELEMENTS BY IRRADIATIONS AT NAL.

Request	12 Jul, 71	Parasitic Running with a total of 10 to the 18th protons on target	
Approval	26 Aug, 71	Target Exposure(s)	
Completed	4 Jun, 75	1 Target(s)	

143A 30-INCH PI- - P @ 300 #143A — George R. Kalbfleisch

BROOKHAVEN NATIONAL LABORATORY
CASE WESTERN RESERVE UNIVERSITY

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL FOR A RAPID SYSTEMATIC STUDY OF ALL INTERACTIONS IN A PI- - P EXPOSURE OF THE BARE 30-INCH CHAMBER AT 120 GEV/C.

Request	12 Jul, 71	50 K Pix	
Approval	26 Aug, 71	50 K Pix	in bare chamber with events where there is downstream spark chamber data to be shared with exp #2B
Completed	10 Apr, 74	51 K Pix	

147 SUPER-HEAVY ELEMENTS #147 — Monique DeBeauvais

CRN, STRASBOURG (FRANCE)
UNIVERSITY OF OTTAWA (CANADA)

BEAM: Meson Area - Miscellaneous
PROPOSAL OF AN EXPERIMENT ON THE FISSION OF VERY HEAVY NUCLEI INDUCED BY 200 GEV PROTONS.

Request	9 Jul, 71	Target Exposure(s)	
Approval	6 Aug, 73	Target Exposure(s)	
Completed	11 Jun, 75	4 Exposure(s)	

152B PHOTOPRODUCTION #152B — Clemens A. Heusch

UNIV. OF CALIFORNIA, SANTA CRUZ

BEAM: Proton Area - East
PROPOSAL TO BUILD AN ELECTRON-PHOTON FACILITY AT NAL AND TO MEASURE PHOTON SCATTERING AT HIGH ENERGIES.
(Measurement of total cross sections, elastic and inelastic scattering meson production, and a search for new particles.)

Request	19 Jul, 71	300 Hours	with actual data taking of 160 hours
	23 Jun, 72	490 Hours	total with an additional 190 hours of data taking
Approval	4 Mar, 74	350 Hours	with understanding that there will be a collaborative effort in development and construction of equipment with exp# 263
	28 Jun, 78	1,800 Hours	approximately with the experiment to be considered complete by the time of the fall 1978 shutdown
Completed	13 Nov, 78	1,950 Hours	

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154 30-INCH HYBRID #154 — **Irwin A. Pless**

BEAM: Neutrino Area - 30 in. Hadron Beam
TEST OF PROPORTIONAL WIRE CHAMBERS IN HYBRID SYSTEMS.

BROWN UNIVERSITY
FERMILAB
ILLINOIS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
INDIANA UNIVERSITY
JOHNS HOPKINS UNIVERSITY
MASSACHUSETTS INST. OF TECHNOLOGY
OAK RIDGE NATIONAL LABORATORY
RUTGERS UNIVERSITY
STEVENS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF TENNESSEE, KNOXVILLE
YALE UNIVERSITY

Request	23 Jun, 71	2,000 K Pix	
Approval	27 Aug, 71	20 K Pix	with understanding that work will be done in two phases. Phase I - design, construction, installation, and initial operation of upstream tagging system Phase II - use of downstream PWC's for feasibility test run of 20K pix
	6 Aug, 73	120 K Pix	with additional 100K pix to be taken with single type incident particles at a given energy
Completed	13 Mar, 74	105 K Pix	of pi- - p @ 150 GeV

155 15-FOOT EMI TEST #155 — **Vincent Z. Peterson**

BEAM: Neutrino Area - Wide Band Horn
PROPOSAL TO DEVELOP A PHASE I EXTERNAL MUON IDENTIFIER (EMI) FOR USE WITH THE NAL 30 CUBIC METER BUBBLE CHAMBER.

UNIVERSITY OF HAWAII AT MANOA
LAWRENCE BERKELEY LABORATORY

Request	15 Jul, 71	Test Running	
Approval	27 Aug, 71	Parasitic Running	with understanding that completion of Phase I will include tests in neutrino beam with 15-ft bubble chamber in operation and number of pix to be determined at a later date
	17 Dec, 71	Parasitic Running	with 100K pix to be taken from exp# 45A exposures taken when EMI was operating; film containing about 200 events to be delivered as soon as feasible to aid in preliminary tuneup and checking
	26 Jun, 74	50 K Pix	with formal approval for dedicated pictures to follow successful analysis of 200 events from exp# 45A exposures
Completed	30 Nov, 74	14 K Pix	

156 EMULSION/PROTONS @ 200 #156 — **Kiyoshi Niu**

BEAM: Meson Area - Miscellaneous
STUDY OF SECONDARY PARTICLES PRODUCED BY 200 AND 500 GEV PROTONS IN EMULSION CHAMBERS.

AICHI UNIV. OF EDUCATION (JAPAN)
KWANSEI GAKUIN UNIVERSITY (JAPAN)
NAGOYA UNIVERSITY (JAPAN)
UNIVERSITY OF TOKYO (JAPAN)
YOKOHAMA NATIONAL UNIV. (JAPAN)

Request	15 Aug, 71	Emulsion Exposure	
Approval	1 Sep, 71	Emulsion Exposure	
Completed	20 Sep, 72	13 Stack(s)	

161 30-INCH P - P&NE @ 300 #161 — **James Mapp**

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL TO SURVEY HIGH ENERGY PROTON COLLISIONS IN NEON AND TO SEARCH FOR ANOMALOUS PHOTON BUNDLES AT NAL.

UNIVERSITY OF WISCONSIN-MADISON

Request	13 Oct, 71	50 K Pix	
Approval	6 Aug, 73	50 K Pix	
Completed	25 Jun, 74	51 K Pix	

163A 30-INCH PI- - P&NE @ 200 #163A — **William D. Walker**

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL FOR A STUDY OF THE INTERACTION OF HIGH ENERGY PI- WITH NEON.

DUKE UNIVERSITY
UNIVERSITY OF NORTH CAROLINA

Request	4 Dec, 71	50 K Pix	
Approval	19 Jul, 72	50 K Pix	
Completed	18 Jun, 74	52 K Pix	

171 EMULSION/PROTONS @ 200 #171 — **Jere J. Lord**

BEAM: Meson Area - Miscellaneous
PROPOSED EMULSION EXPERIMENT SEARCH FOR SHORT LIVED PARTICLES AT HIGH ENERGIES.

UNIVERSITY OF WASHINGTON

Request	10 May, 72	Emulsion Exposure	
Approval	1 Aug, 72	Emulsion Exposure	
Completed	20 Sep, 72	6 Stack(s)	

172 15-FOOT ANTI-NEUTRINO/H2&NE#172 — **Henry J. Lubatti**

BEAM: Neutrino Area - Wide Band Horn
ANTINEUTRINO INTERACTIONS IN THE 15-FOOT H2-NEON BUBBLE CHAMBER.

UNIV. OF CALIFORNIA, BERKELEY
UNIVERSITY OF HAWAII AT MANOA
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF WASHINGTON

Request	16 May, 72	50 K Pix	
Approval	19 Jul, 72	50 K Pix	
Completed	25 May, 76	49 K Pix	

177A PROTON-PROTON ELASTIC #177A — **Jay Orear**

BEAM: Proton Area - West
EARLY MEASUREMENT OF HIGH ENERGY P P LARGE ANGLE ELASTIC SCATTERING.

CORNELL UNIVERSITY
LEBEDEV PHYSICAL INST. (RUSSIA)
MCGILL UNIVERSITY (CANADA)
NORTHEASTERN UNIVERSITY

Request	12 Jun, 72	100 Hours	for initial run
	27 Oct, 72	700 Hours	total with additional 600 hours for data
Approval	13 Aug, 73	100 Hours	for Phase I; counter tests to demonstrate success of proposed technique
	28 Jun, 76	700 Hours	with 600 hours additional for data
	19 Nov, 76	1,500 Hours	with additional 800 hours to collect data at 200 GeV and 400 GeV to t-values of 18 GeV squared; completion of run expected by 15 Feb 1977
	7 Mar, 77	2,200 Hours	with additional 700 hours to collect data in high t region with completion of experiment expected at end of April 1977
Completed	19 Apr, 77	2,400 Hours	

178 MULTIPLICITIES #178 — **Wit Busza**

BEAM: Meson Area - M6 Beam
A STUDY OF THE AVERAGE MULTIPLICITY AND MULTICIPLICITY DISTRIBUTIONS IN HADRON-NUCLEUS COLLISIONS AT HIGH ENERGIES.
(Using Cerenkov counter pulse height analysis.)

CARELTON UNIVERSITY (CANADA)
FERMILAB
MASSACHUSETTS INST. OF TECHNOLOGY

Request	16 Jun, 72	60 Hours	including 20 hours for tests
Approval	6 Aug, 73	100 Hours	with understanding that running will be on a parasitic basis during tuning of M6 beam line by exp# 96
	25 Oct, 74	200 Hours	with an additional 100 hours of running in the M6 beam line
Completed	14 Aug, 75	800 Hours	

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180 15-FOOT ANTI-NEUTRINO/H2&NE#180 — **Pavel F. Ermolov**

FERMILAB
UNIVERSITY OF MICHIGAN
ITEP, MOSCOW (RUSSIA)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)

BEAM: Neutrino Area - Wide Band Horn
A STUDY OF ANTINEUTRINO INTERACTIONS IN THE NAL 15-FOOT BUBBLE CHAMBER, FILLED WITH HYDROGEN AND NEON.

Request	23 Jun, 72	200 K Pix	
Approval	11 Jul, 72	50 K Pix	of antineutrinos to run before exp# 172 and to have first choice of the two H2/neon mixtures
	29 Jun, 76	200 K Pix	including an additional 150K pix; with the expectation that the experiment will involve a total of 500K pix
Approved/Inactive	1 Jun, 77	273 K Pix	as of 01 Jun 1977

181 EMULSION/PROTONS @ 300 #181 — **Arthur S. Cary**

HARVEY MUDD COLLEGE

BEAM: Neutrino Area - Miscellaneous
THE DIRECT PRODUCTION OF ELECTRON PAIRS IN NUCLEAR EMULSION BY 100 AND 200 GEV PROTONS.

Request	27 Jul, 72	Emulsion Exposure
Approval	15 Nov, 72	Emulsion Exposure
Completed	20 Oct, 73	3 Stack(s)

183 EMULSION/PROTONS @ 200 #183 — **M. I. Tretjakova**

LEBEDEV PHYSICAL INST. (RUSSIA)

BEAM: Meson Area - Miscellaneous
A PROPOSAL OF THE PHOTOEMULSION EXPERIMENT AT THE NATIONAL ACCELERATOR LABORATORY (BATAVIA).

Request	7 Jul, 72	Emulsion Exposure
Approval	1 Aug, 72	Emulsion Exposure
Completed	20 Sep, 72	3 Stack(s)

184 PARTICLE SEARCH #184 — **Peter J. Wanderer**

UNIVERSITY OF CHICAGO
HARVARD UNIVERSITY
UNIVERSITY OF PENNSYLVANIA
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Internal Target Area (C-0)
SEARCH FOR A NEW CLASS OF PENETRATING MASSIVE PARTICLES AT C-0.

Request	14 Sep, 72	Unspecified	
Approval	5 Oct, 72	400 Hours	with installation to begin at time of removal of exp# 120 and extending for a period of one month
	6 Aug, 73	600 Hours	with approval for occupancy at C-0 for 6 weeks
	22 Feb, 74	760 Hours	with an authorized extension of 160 hours
Completed	29 May, 74	800 Hours	

186 PROTON-DEUTERON SCATTERING #186 — **Adrian Melissinos**

FERMILAB
JINR, DUBNA (RUSSIA)
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY

BEAM: Internal Target Area (C-0)
A PROPOSAL TO STUDY SMALL ANGLE PROTON-DEUTERON SCATTERING.
(Using a gas jet target with deuterium and the internal proton beam; t from 0.001 - 0.020.)

Request	19 Oct, 72	400 Hours
Approval	1 Nov, 72	400 Hours
Completed	19 Aug, 74	450 Hours

187 PARTICLE SEARCH #187 — **Leon M. Lederman**

COLUMBIA UNIVERSITY
FERMILAB

BEAM: Proton Area - Center
PHASE 0.8 - SEARCH FOR LONG-LIVED MASSIVE OBJECTS (HIGH ENERGY CALIBRATION RUN).
(Relying on r.f. bunching and time of flight measurement.)

Request	5 Sep, 72	Unspecified
Approval	30 Oct, 72	100 Hours
Completed	6 Nov, 73	200 Hours

188 PROTON-NUCLEON INCLUSIVE #188 — **Felix Sannes**

UNIV. OF ILLINOIS, CHICAGO CIRCLE
IMPERIAL COLLEGE (ENGLAND)
RUTGERS UNIVERSITY
UPSALA COLLEGE

BEAM: Internal Target Area (C-0)
A PROPOSAL TO MEASURE CROSS SECTIONS FOR P-P TO P-X, N-X AS A FUNCTION OF S AND MX SQUARED USING THE INTERNAL TARGET FACILITY AT NAL.

Request	25 Oct, 72	200 Hours
Approval	1 Nov, 72	200 Hours
Completed	9 May, 73	1,050 Hours

189 EMULSION/PROTONS @ 200 #189 — **David Ritson**

STANFORD UNIVERSITY

BEAM: Meson Area - Miscellaneous
NUCLEAR EMULSION EXPOSURES TO 400 GEV.
(For student laboratory use.)

Request	16 Oct, 72	Emulsion Exposure
Approval	2 Nov, 72	Emulsion Exposure
Completed	20 Sep, 72	2 Plate(s)

194 30-INCH P - D @ 100 #194 — **C. Thornton Murphy**

CARNEGIE-MELLON UNIVERSITY
FERMILAB
UNIVERSITY OF MICHIGAN
SUNY AT STONY BROOK

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL TO STUDY PROTON-DEUTERON INTERACTIONS IN THE 30-INCH BUBBLE CHAMBER.

Request	13 Nov, 72	200 K Pix	
Approval	1 Mar, 74	100 K Pix	in bare chamber with downstream chamber data if it can be arranged
Completed	20 Aug, 76	92 K Pix	

195 EMULSION/PROTONS @ 300 #195 — **Yu K. Lim**

CRFC, CAMBRIDGE
EMMANUEL COLLEGE
MISSISSIPPI STATE UNIVERSITY
UNIVERSITY OF SINGAPORE(SINGAPORE)

BEAM: Neutrino Area - Miscellaneous
PROPOSAL TO MEASURE THE LIFETIME OF THE NEUTRAL PION.

Request	13 Nov, 72	Emulsion Exposure
Approval	15 Nov, 72	Emulsion Exposure
Completed	10 Jun, 75	3 Stack(s)

196 30-INCH P - D @ 400 #196 — **Roderich J. Engelmann**

CARNEGIE-MELLON UNIVERSITY
FERMILAB
UNIVERSITY OF MICHIGAN
SUNY AT STONY BROOK

BEAM: Neutrino Area - 30 in. Hadron Beam
PROTON-DEUTERON INTERACTIONS IN THE BARE 30-INCH BUBBLE CHAMBER.

Request	13 Nov, 72	100 K Pix	
Approval	21 Mar, 74	100 K Pix	in bare chamber with downstream chamber data if it can be arranged
Completed	20 Oct, 75	109 K Pix	

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198A PROTON-NUCLEON SCATTERING #198A — **Stephen L. Olsen**

IMPERIAL COLLEGE (ENGLAND)
UNIVERSITY OF ROCHESTER
RUTGERS UNIVERSITY

BEAM: Internal Target Area (C-0)
A PROPOSAL FOR A MAGNETIC RECOIL SPECTROMETER FOR THE GAS JET TARGET.
(Use of the gas jet target with H2 and D2 to study p - p and p - d scattering with the internal proton beam; t from 0.15 - 3.0.)

Request	22 Dec, 72	800 Hours
Approval	22 Mar, 74	800 Hours contingent on construction of C-0 extension
	26 Jun, 74	800 Hours with the understanding that concurrent running with exp# 313 be arranged whenever possible
Completed	19 Apr, 77	900 Hours

199 MASSIVE PARTICLE SEARCH #199 — **Sherman Frankel**

FERMILAB
UNIVERSITY OF PENNSYLVANIA

BEAM: Neutrino Area - Miscellaneous
SEARCH FOR WEAKLY PRODUCED MASSIVE LONG LIVED PARTICLES AT NAL.
(Using a threshold Cerenkov counter.)

Request	21 Dec, 72	Target Exposure(s)
Approval	15 Jan, 73	Target Exposure(s)
Completed	22 Aug, 73	2 Targets Exposed

202 TACHYON MONOPOLE #202 — **David F. Bartlett**

UNIVERSITY OF COLORADO AT BOULDER
PRINCETON UNIVERSITY

BEAM: Neutrino Area - Miscellaneous
SEARCH FOR TACHYON MONOPOLES IN COSMIC RAYS ABOVE 15-FOOT BUBBLE CHAMBER.
(Using magnet fringe field.)

Request	1 Feb, 73	800 Hours of which half would be at zero field
Approval	22 Aug, 73	Parasitic Running
Completed	19 May, 76	Cosmic Ray Running

203A MUON #203A — **Leroy T. Kerth**

UNIV. OF CALIFORNIA, BERKELEY
FERMILAB
LAWRENCE BERKELEY LABORATORY
PRINCETON UNIVERSITY

BEAM: Neutrino Area - Muon/Hadron Beam
FEASIBLE SEARCH FOR HEAVY NEUTRAL MUONS PREDICTED BY GAUGE THEORIES AND CONCURRENT MEASUREMENT OF DEEP-INELASTIC VIRTUAL COMPTON SCATTERING.

Request	9 Mar, 73	600 Hours with muon beam intensity of 5 x 10 to the 6th per pulse
Approval	26 Mar, 75	500 Hours with formal approval of 1 x 10 to the 18th protons
	23 Mar, 78	1,200 Hours with the expectation to run the experiment until about April 27, 1978
Completed	18 May, 78	1,200 Hours

205A EMULSION/MUONS @ 150 #205A — **Osamu Kusumoto**

KINKI UNIVERSITY (JAPAN)
KOBE UNIVERSITY (JAPAN)
OKAYAMA UNIVERSITY (JAPAN)
OSAKA CITY UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)
UNIVERSITY OF TOKYO (JAPAN)

BEAM: Neutrino Area - Miscellaneous
PHENOMENOLOGICAL STUDY OF MUON-NUCLEON COLLISION AT ENERGY MORE THAN 100 GEV IN EMULSION.

Request	4 Apr, 73	Emulsion Exposure
Approval	15 Jun, 73	Emulsion Exposure
Completed	16 Oct, 73	2 Stack(s)

209 30-INCH P - D @ 300 #209 — **Fu Tak Dao**

CALIFORNIA INSTITUTE OF TECHNOLOGY
IOWA STATE UNIVERSITY
TUFTS UNIVERSITY
VANDERBILT UNIVERSITY

BEAM: Neutrino Area - 30 in. Hadron Beam
A STUDY OF 300 GEV/C P D INTERACTIONS IN THE THIRTY-INCH BUBBLE CHAMBER.

Request	1 May, 73	50 K Pix
Approval	21 Mar, 74	100 K Pix in bare chamber with downstream chamber data if it can be arranged
Completed	7 Oct, 76	106 K Pix

211 BEAM DUMP #211 — **Klaus Goebel**

CERN (SWITZERLAND)
FERMILAB

BEAM: Neutrino Area - Miscellaneous
PROPOSAL FOR RADIATION MEASUREMENTS AROUND A PROTON BEAM DUMP AT 300 GEV.
(Early measurements to confirm calculations for CERN; very reduced version of exp #108.)

Request	18 Apr, 73	10 Hours with a total of 10 to the 15th protons
Approval	20 Apr, 73	10 Hours
Completed	14 Nov, 73	2 Hours

216 FORM FACTOR #216 — **Donald H. Stork**

UNIV. OF CALIFORNIA, LOS ANGELES
FERMILAB
JINR, DUBNA (RUSSIA)
NOTRE DAME UNIVERSITY
UNIVERSITY OF PITTSBURGH

BEAM: Meson Area - M1 Beam
A MEASUREMENT OF THE PION FORM FACTOR BY DIRECT PION-ELECTRON SCATTERING.

Request	25 May, 73	630 Hours
Approval	6 Aug, 73	100 Hours for testing and running at 100 GeV to assess background effects
	7 Jul, 75	600 Hours with additional 500 hours of running in M-1 beam line and encouragement to select a single high energy for measurement
Completed	1 Oct, 75	900 Hours

217 30-INCH PI+ & P - P @ 200 #217 — **Richard L. Lander**

UNIV. OF CALIFORNIA, DAVIS
LAWRENCE BERKELEY LABORATORY
SLAC

BEAM: Neutrino Area - 30 in. Hadron Beam
A COMPARISON OF 100 GEV AND 200 GEV PI+ - P INTERACTIONS.

Request	29 May, 73	50 K Pix
Approval	6 Aug, 73	50 K Pix
Completed	15 May, 74	85 K Pix

218 30-INCH PI- - D @ 200 #218 — **Philip M. Yager**

UNIV. OF CALIFORNIA, DAVIS
INP, KRAKOW (POLAND)
WARSAW UNIVERSITY, INP, (POLAND)
UNIVERSITY OF WASHINGTON

BEAM: Neutrino Area - 30 in. Hadron Beam
PION-DEUTERON INTERACTIONS AT 200 GEV/C.

Request	29 May, 73	50 K Pix
Approval	21 Mar, 74	50 K Pix in bare chamber with downstream chamber data if it can be arranged
Completed	18 Sep, 74	72 K Pix

221 PROTON-PROTON INELASTIC #221 — **Paolo Franzini**

COLUMBIA UNIVERSITY
SUNY AT STONY BROOK

BEAM: Internal Target Area (C-0)
P - P INELASTIC SCATTERING IN THE DIFFRACTIVE REGION.
(Continuation of experiment #14A.)

Request	8 Jun, 73	400 Hours including 200 hours of setup and tuning
Approval	6 Aug, 73	400 Hours
Completed	5 Sep, 74	950 Hours

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226 K ZERO CHARGE RADIUS #226 — Valentine L. Telegdi

UNIVERSITY OF CHICAGO
LHE, ETH HONGGERBERG (SWITZERLAND)
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M4 Beam
COHERENT K-SHORT REGENERATION BY ELECTRONS.

Request	12 Jun, 73	720 Hours	
	15 Nov, 74	2,100 Hours	total for Phase 1, 500 hours in M4 line; and Phase 2, 1600 hours in M3 line
Approval	22 Nov, 74	500 Hours	
	30 Jun, 76	600 Hours	with a total of 800 hours approved for the combination of E-486 and E-226
Completed	17 Mar, 77	1,200 Hours	

228 30-INCH PI+ & P - P @ 60 #228 — Thomas Ferbel

UNIVERSITY OF MICHIGAN
UNIVERSITY OF ROCHESTER

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL TO EXTEND THE ENERGY RANGE OF A STUDY OF MULTIPARTICLE PRODUCTION IN P - P COLLISIONS.
(Request for the remaining pictures for exp #252 to be with a momentum of 60 GeV/c.)

Request	16 Jun, 73	25 K Pix
	20 Feb, 74	35 K Pix total with a pi/p ratio of 5/3
Approval	6 Aug, 73	25 K Pix in bare chamber with tagged beam
	14 Mar, 74	35 K Pix including additional 10K pix and a pi/p ratio of about 5/3
Completed	15 Apr, 74	37 K Pix

229 DETECTOR DEVELOPMENT #229 — Luke C. L. Yuan

BROOKHAVEN NATIONAL LABORATORY

BEAM: Meson Area - M1 Beam
A PROPOSAL FOR TESTING A TRANSITION RADIATION DETECTOR AT NAL.

Request	19 Jun, 73	100 Hours
Approval	23 Aug, 73	Parasitic Running for about 200 hours
Completed	16 Nov, 74	300 Hours

230 MULTIGAMMA #230 — Michael J. Longo

UNIVERSITY OF MICHIGAN

BEAM: Meson Area - M3 Beam
A SEARCH FOR "SCHEIN EVENTS" AND EVENTS WITH A HIGH MULTIPLICITY OF GAMMAS.

Request	25 Jun, 73	40 Hours	
Approval	6 Aug, 73	40 Hours	with restriction that wide gap chambers will not cause any interference with other experiments in the area
Completed	24 Apr, 74	50 Hours	

232 EMULSION/PROTONS @ 300 #232 — David T. King

UNIVERSITY OF TENNESSEE, KNOXVILLE

BEAM: Neutrino Area - Miscellaneous
400-GEV PROTONS ON COMPLEX NUCLEI.

Request	6 Jul, 73	Emulsion Exposure
Approval	16 Aug, 73	Emulsion Exposure
Completed	20 Oct, 73	2 Stack(s)

233 EMULSION/PROTONS @ 300 #233 — Jacques D. Hebert

UNIVERSITY OF BARCELONA (SPAIN)
UNIVERSITY OF BELGRADE(YUGOSLAVIA)
IAP, BUCHAREST (ROMANIA)
CRN, STRASBOURG (FRANCE)
FERMILAB
UNIVERSITY OF LUND (SWEDEN)
MCGILL UNIVERSITY (CANADA)
UNIVERSITY OF NANCY (FRANCE)
UNIVERSITY OF OTTAWA (CANADA)
UNIV. OF PARIS VI, LPG (FRANCE)
UNIVERSITY OF QUEBEC (CANADA)
LRC, LYON (FRANCE)
INFN, ROME (ITALY)
IFC, VALENCIA (SPAIN)

BEAM: Neutrino Area - Miscellaneous
300 GEV (AND 400 GEV) PROTON INTERACTIONS IN NUCLEAR EMULSION.

Request	16 Jul, 73	Emulsion Exposure
Approval	16 Aug, 73	Emulsion Exposure
Completed	20 Oct, 73	8 Stack(s)

234 15-FOOT ENGINEERING RUN #234 — Fred Russ Huson

FERMILAB
FLORIDA STATE UNIVERSITY

BEAM: Neutrino Area - 15 ft. Hadron Beam
AN ENGINEERING RUN FOR THE NAL 15-FOOT CRYOGENIC BUBBLE CHAMBER.

Request	1 Aug, 73	50 K Pix
Approval	6 Aug, 73	50 K Pix
Completed	5 Nov, 74	57 K Pix of pi- - p interactions at 250 GeV/c

236A HADRON JETS #236A — Paul M. Mockett

FERMILAB
TUFTS UNIVERSITY
UNIVERSITY OF WASHINGTON

BEAM: Meson Area - M1 Beam
A PROPOSAL TO EXPLORE THE LARGE-PT DOMAIN: INCLUSIVE CROSS SECTIONS AND POSSIBLE JET STRUCTURE.

Request	13 Aug, 73	550 Hours	for tests and data
	16 Dec, 76	1,150 Hours	including an additional 400 hours for data and 200 hours for tests
Approval	22 Jan, 74	550 Hours	
	1 Apr, 77	1,150 Hours	including additional 600 hours to complete experiment during a six week running period
Completed	20 Jul, 77	1,700 Hours	

237 EMULSION/PROTONS @ 300 #237 — Jere J. Lord

UNIVERSITY OF WASHINGTON

BEAM: Neutrino Area - Miscellaneous
EMULSION EXPOSURE TO 300 GEV PROTONS.

Request	14 Aug, 73	Emulsion Exposure
Approval	11 Sep, 73	Emulsion Exposure
Completed	10 Jun, 75	5 Stack(s)

238 EMULSION/PROTONS @ 400 #238 — Jere J. Lord

UNIVERSITY OF WASHINGTON

BEAM: Neutrino Area - Miscellaneous
EMULSION EXPOSURE TO 400 GEV PROTONS.

Request	14 Aug, 73	Emulsion Exposure
Approval	12 Mar, 74	Emulsion Exposure
Completed	9 Dec, 75	9 Stack(s)

239 LONG-LIVED PARTICLES #239 — William Frati

FERMILAB
UNIVERSITY OF PENNSYLVANIA

BEAM: Neutrino Area - Miscellaneous
PROPOSAL FOR A FURTHER SEARCH FOR LONG LIVED PARTICLES AT NAL.
(With a Cerenkov counter looking at the neutrino target from the 90 degree monitor pipe.)

Request	15 Jul, 73	Parasitic Running
Approval	6 Dec, 73	Parasitic Running
Completed	3 Feb, 74	350 Hours

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242 EMULSION/PROTONS @ 300 #242 — **Kiyoshi Niu**

BEAM: Neutrino Area - Miscellaneous
STUDY OF SECONDARY PARTICLES PRODUCED BY 300 GEV PROTONS IN EMULSION CHAMBERS.

AICHI UNIV. OF EDUCATION (JAPAN)
NAGOYA UNIVERSITY (JAPAN)
YOKOHAMA NATIONAL UNIV. (JAPAN)

Request	28 Sep, 73	Emulsion Exposure
Approval	22 Nov, 73	Emulsion Exposure
Completed	20 Oct, 73	2 Stack(s)

243 EMULSION/PROTONS @ 400 #243 — **Kiyoshi Niu**

BEAM: Neutrino Area - Miscellaneous
STUDY OF SECONDARY PARTICLES PRODUCED BY 400 GEV PROTONS IN EMULSION CHAMBERS.

AICHI UNIV. OF EDUCATION (JAPAN)
KONAN UNIVERSITY (JAPAN)
NAGOYA UNIVERSITY (JAPAN)
YOKOHAMA NATIONAL UNIV. (JAPAN)

Request	28 Sep, 73	Emulsion Exposure
Approval	12 Mar, 74	Emulsion Exposure
Completed	9 Dec, 75	7 Stack(s)

244 EMULSION/PROTONS @ 300 #244 — **Piyare L. Jain**

BEAM: Neutrino Area - Miscellaneous
INTERACTION OF 300 GEV PROTONS IN NUCLEAR EMULSION.

SUNY AT BUFFALO

Request	1 Oct, 73	Emulsion Exposure
Approval	22 Nov, 73	Emulsion Exposure
Completed	20 Oct, 73	1 Stack(s)

245 EMULSION/PROTONS @ 400 #245 — **Piyare L. Jain**

BEAM: Neutrino Area - Miscellaneous
INTERACTION OF 400 GEV PROTONS IN NUCLEAR EMULSION.

SUNY AT BUFFALO

Request	1 Oct, 73	Emulsion Exposure
Approval	3 Mar, 74	Emulsion Exposure
Completed	9 Dec, 75	1 Stack(s)

247 PARTICLE SEARCH #247 — **Eric H. S. Burhop**

BEAM: Neutrino Area - Wide Band Horn
A PROPOSED EXPERIMENT TO SEARCH FOR HEAVY LEPTONS.
(Using a hybrid emulsion-spark chamber arrangement.)

UNIV. COLLEGE DUBLIN (IRELAND)
FERMILAB
UNIVERSITY OF LIBRE (BELGIUM)
LONDON UNIVERSITY COLLEGE(ENGLAND)
INFN, ROME (ITALY)
UNIVERSITY OF STRASBOURG (FRANCE)

Request	21 Sep, 73	1,000 Hours with request for a bombardment of 2 x 10 to the 18th protons
Approval	2 Oct, 73	Unspecified but with expectation of test running for feasibility studies
	26 Mar, 75	1,000 Hours with formal approval for 2 x 10 to the 18th protons subject to the condition that running is compatible with exp# 310 and the 15-ft bubble chamber program
	11 Mar, 76	1,000 Hours with formal approval for 2 x 10 to the 18th protons and high priority
Completed	18 May, 76	350 Hours

248 NEUTRON ELASTIC SCATTERING #248 — **Michael J. Longo**

BEAM: Meson Area - M3 Beam
NEUTRON-PROTON DIFFRACTION SCATTERING UP TO 300 GEV.
(Differential cross sections with t from 0.1 to 3.5; formerly referred to as exp #4II.)

UNIVERSITY OF MICHIGAN

Request	15 May, 70	700 Hours as an estimate
Approval	1 Aug, 70	400 Hours
Completed	10 Dec, 76	2,400 Hours

249 EMULSION/PROTONS @ 400 #249 — **Wladyslaw Wolter**

BEAM: Neutrino Area - Miscellaneous
CRACOW EMULSION EXPOSURE TO 400 GEV PROTONS.

INP, KRAKOW (POLAND)

Request	8 Oct, 73	Emulsion Exposure
Approval	12 Mar, 74	Emulsion Exposure
Completed	9 Dec, 75	3 Stack(s)

250 EMULSION/PROTONS @ 300 #250 — **Osamu Kusumoto**

BEAM: Neutrino Area - Miscellaneous
PHENOMENOLOGICAL STUDY OF PROTON-NUCLEUS COLLISION AT NAL ENERGIES IN EMULSION (300 GEV).

KINKI UNIVERSITY (JAPAN)
KOBE UNIVERSITY (JAPAN)
OSAKA CITY UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)
WAKAYAMA MEDICAL COLLEGE (JAPAN)

Request	10 Oct, 73	Emulsion Exposure
Approval	22 Nov, 73	Emulsion Exposure
Completed	20 Oct, 73	1 Stack(s)

251 EMULSION/PROTONS @ 400 #251 — **Osamu Kusumoto**

BEAM: Neutrino Area - Miscellaneous
PHENOMENOLOGICAL STUDY OF PROTON-NUCLEUS COLLISION AT NAL ENERGIES IN EMULSION (400 GEV).

KINKI UNIVERSITY (JAPAN)
KOBE UNIVERSITY (JAPAN)
OSAKA CITY UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)
WAKAYAMA MEDICAL COLLEGE (JAPAN)

Request	10 Oct, 73	Emulsion Exposure
Approval	22 Oct, 73	Emulsion Exposure
Completed	9 Dec, 75	3 Stack(s)

252 30-INCH P-P @ 100 #252 — **Thomas Ferbel**

BEAM: Neutrino Area - 30 in. Hadron Beam
STUDY OF MULTIPARTICLE PRODUCTION IN A 30-INCH BUBBLE CHAMBER.
(Formerly known as experiment #138I.)

UNIVERSITY OF MICHIGAN
UNIVERSITY OF ROCHESTER

Request	10 May, 71	240 K Pix
Approval	26 Aug, 71	50 K Pix in bare chamber with events where there is downstream spark chamber data to be shared with exp #2B
Completed	6 Dec, 72	33 K Pix

253 NEUTRINO #253 — **Luke W. Mo**

BEAM: Neutrino Area - Wide Band Horn
NEUTRINO-ELECTRON SCATTERING AT NAL.

IHEP, BEIJING (PRC)
UNIVERSITY OF MARYLAND
NATIONAL SCIENCE FOUNDATION
UNIVERSITY OF OXFORD (ENGLAND)
VIRGINIA POLYTECHNIC INSTITUTE

Request	15 Oct, 73	Parasitic Running expected to total 1,000 hours
Approval	7 Jul, 75	Parasitic Running
Completed	7 Mar, 79	2,050 Hours

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254 NEUTRINO #254 — George R. Kalbfleisch

BEAM: Neutrino Area - Dichromatic
PROPOSAL TO SEARCH FOR A SECOND MUON NEUTRINO.
(Dichromatic beam incident on target calorimeter with muon spectrometer of exp #21A; muon monitoring instrumentation will be added.)

BROOKHAVEN NATIONAL LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
FERMILAB
PURDUE UNIVERSITY

Request	17 Oct, 73	300 Hours with total flux of 3 x 10 to the 17th protons
Approval	22 Nov, 74	300 Hours with a formal approval for 3 x 10 to the 17th protons and the hope that running can be coordinated with exp# 21
Completed	15 Oct, 75	550 Hours

255 EMULSION/MUONS @ 150 #255 — Piyare L. Jain

BEAM: Neutrino Area - Miscellaneous
EXPOSURE OF NUCLEAR EMULSIONS TO A BEAM OF 150 GEV MUONS AT THE NATIONAL ACCELERATOR LABORATORY.

SUNY AT BUFFALO

Request	15 Oct, 73	Emulsion Exposure
Approval	22 Oct, 73	Emulsion Exposure
Completed	16 Oct, 73	1 Stack(s)

258 PION INCLUSIVE #258 — Melvyn Jay Shochet

BEAM: Proton Area - West
A PROPOSAL TO MEASURE PARTICLES PRODUCED AT HIGH TRANSVERSE MOMENTUM BY PIONS.

UNIVERSITY OF CHICAGO
PRINCETON UNIVERSITY

Request	22 Oct, 73	Unspecified
Approval	26 Jun, 74	800 Hours contingent upon development of a suitable beam
Completed	9 Jul, 79	1,500 Hours

260 HADRON JETS #260 — Donald W. McLeod

BEAM: Meson Area - M6 Beam
A PROPOSAL TO STUDY HIGH PT PHYSICS WITH A MULTIPARTICLE SPECTROMETER.

CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIV. OF CALIFORNIA, LOS ANGELES
FERMILAB
UNIV. OF ILLINOIS, CHICAGO CIRCLE
INDIANA UNIVERSITY
MAX-PLANCK INSTITUTE (GERMANY)

Request	26 Oct, 73	650 Hours
	9 Aug, 76	1,150 Hours including an extension of 500 hours to complete the experiment
Approval	16 Nov, 73	200 Hours to come out of the 800 hours previously approved for exp# 110A
	13 Aug, 76	950 Hours for data including an additional 750 hours with the understanding that the commitment to the experiment is to be complete before a shutdown in September 1976
Completed	20 Sep, 76	2,300 Hours

261 DETECTOR DEVELOPMENT #261 — Ching Lin Wang

BEAM: Meson Area - M1 Beam
PROPOSAL TO TEST TRANSITION COUNTERS AT NAL.

BROOKHAVEN NATIONAL LABORATORY
FERMILAB

Request	26 Oct, 73	Parasitic Running expected to total 200 hours
Approval	17 Jan, 74	Parasitic Running for about 200 hours
Completed	20 Nov, 74	600 Hours

262 NEUTRINO #262 — Barry C. Barish

BEAM: Neutrino Area - Dichromatic
NEUTRAL CURRENT INVESTIGATION AT NAL.
(Using the Dichromatic beam, target calorimeter, and spectrometer of exp. #21A.)

CALIFORNIA INSTITUTE OF TECHNOLOGY
FERMILAB

Request	28 Oct, 73	300 Hours to include 3 x 10 to the 17th protons
Approval	16 Nov, 73	300 Hours with understanding that this will include 3 x 10 to the 17th protons
Completed	20 Mar, 74	400 Hours

264 EMULSION/PI- @ 200 #264 — Poh Shien Young

BEAM: Neutrino Area - Miscellaneous
EXPOSURE OF EMULSIONS TO 200-300 GEV PI- FOR NEW DETERMINATION OF MEAN LIFE OF PI ZERO.

MISSISSIPPI STATE UNIVERSITY
UNIVERSITY OF TENNESSEE, KNOXVILLE

Request	31 Oct, 73	Emulsion Exposure
Approval	12 Mar, 74	Emulsion Exposure
Completed	7 Oct, 74	2 Stack(s)

265 EMULSION/PROTONS @ 400 #265 — Poh Shien Young

BEAM: Neutrino Area - Miscellaneous
EXPOSURE OF EMULSIONS TO 400 GEV PROTONS FOR NEW DETERMINATION OF MEAN LIFE OF PI ZERO.

CRFC, CAMBRIDGE
MISSISSIPPI STATE UNIVERSITY

Request	31 Oct, 73	Emulsion Exposure
Approval	12 Mar, 74	Emulsion Exposure
Completed	9 Dec, 75	3 Stack(s)

268 INCLUSIVE PHOTON #268 — Joel Mellema

BEAM: Meson Area - M2 Beam
A PROPOSAL TO STUDY MESON PRODUCTION AT LARGE P- TRANSVERSE WITH A GAMMA RAY DETECTOR.
(Induced by protons @ 300 GeV and by pi+- @ 100 and 200 GeV; using photon detector of exp #111.)

BROOKHAVEN NATIONAL LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
LAWRENCE BERKELEY LABORATORY

Request	5 Nov, 73	900 Hours total with an initial run of 500 hours
	3 Nov, 75	1,200 Hours including a three-week extension
Approval	21 Mar, 74	100 Hours of running in diffracted proton beam to demonstrate feasibility
	26 Jun, 74	100 Hours with formal approval for parasitic running using a pion beam in front of exp# 51
	22 Nov, 74	600 Hours including an additional 500 hours of running in a pion beam
	10 Nov, 75	900 Hours including an additional three week run to obtain data at a forward angle with a 200 GeV beam
Completed	11 Feb, 76	1,850 Hours

271 EMULSION/PROTONS @ 200 #271 — Kurt Gottfried

BEAM: Neutrino Area - Miscellaneous
MULTIPARTICLE PRODUCTION IN NUCLEI BY PROTONS OF SEVERAL HUNDRED GEV.
(Using target materials consisting of fine wires imbedded in emulsion or foils covering the emulsion; 200 GeV exposure.)

IAP, BUCHAREST (ROMANIA)
CERN (SWITZERLAND)
CORNELL UNIVERSITY
UNIVERSITY OF LUND (SWEDEN)

Request	30 Nov, 73	Emulsion Exposure
Approval	16 Jan, 74	Emulsion Exposure
Completed	10 Jun, 75	10 Stack(s)

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272 HADRON DISSOCIATION #272 — **Thomas Ferbel**

BROOKHAVEN NATIONAL LABORATORY
FERMILAB
UNIVERSITY OF MINNESOTA
UNIVERSITY OF ROCHESTER

BEAM: Meson Area - M1 Beam
PROPOSAL TO MEASURE COHERENT DISSOCIATION OF PI-, K-, AND PBAR INTO TWO-BODY SYSTEMS AT FERMILAB ENERGIES.

Request	3 Dec, 73	600 Hours	
	9 Jun, 75	900 Hours	total with the additional 300 hours of data taking at 150 and 300 GeV/c incident momentum
Approval	7 Jul, 75	600 Hours	
Completed	3 Dec, 79	1,950 Hours	

275 PLASTIC DETECTORS #275 — **Wolfgang Enge**

CHRISTIAN-ALBRECHTS UNIV.(GERMANY)

BEAM: Neutrino Area - Miscellaneous
EXPOSURE OF PLASTIC-DETECTOR STACKS TO A 300 GEV PROTON BEAM AT NAL.

Request	17 Dec, 73	Detector Exposure
Approval	20 Oct, 73	Detector Exposure
Completed	20 Oct, 73	4 Stack(s)

276 QUARK #276 — **Andreas Van Ginneken**

ARGONNE NATIONAL LABORATORY
UNIVERSITY OF CHICAGO
FERMILAB

BEAM: Neutrino Area - Miscellaneous
A SEARCH FOR STABLE INTEGRALLY CHARGED MASSIVE PARTICLES (HAN-NAMBU QUARKS).
(Mass spectroscopic analysis of irradiated target.)

Request	25 Jan, 74	Target Exposure(s)
Approval	8 Jul, 74	Target Exposure(s)
	30 Aug, 76	Target Exposure(s) with different chemicals and re-exposure of two previous samples
Completed	2 Nov, 75	3 Targets Exposed

279 EMULSION/PROTONS @ 400 #279 — **David T. King**

UNIVERSITY OF TENNESSEE, KNOXVILLE

BEAM: Neutrino Area - Miscellaneous
THE INTERACTION OF PA=PAE+E- AT 400 GEV.

Request	28 Jan, 74	Emulsion Exposure
Approval	12 Mar, 74	Emulsion Exposure
Completed	9 Dec, 75	3 Stack(s)

280 30-INCH P - D @ 200 #280 — **Thomas H. Fields**

ARGONNE NATIONAL LABORATORY
CIPP (CANADA)
JINR, DUBNA (RUSSIA)
MOSCOW STATE UNIVERSITY (RUSSIA)

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL TO STUDY P - D INTERACTIONS AT 205 GEV/C IN THE 30-INCH BUBBLE CHAMBER.

Request	1 Feb, 74	100 K Pix	
Approval	21 Mar, 74	100 K Pix	in bare chamber with downstream chamber data if it can be arranged
Completed	11 Oct, 75	103 K Pix	

281 30-INCH HYBRID #281 — **Gerald A. Smith**

IOWA STATE UNIVERSITY
UNIVERSITY OF MARYLAND
MICHIGAN STATE UNIVERSITY
NOTRE DAME UNIVERSITY

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL TO STUDY HIGH ENERGY PROTON-PROTON AND PI-MINUS PROTON INTERACTIONS WITH THE NAL 30-INCH BUBBLE CHAMBER-WIDE GAP SPARK CHAMBER HYBRID SYSTEM.

Request	1 Feb, 74	400 K Pix	including 200K pix of p - p 300 GeV and 200K pix of pi- - p at highest momentum
	25 Sep, 74	700 K Pix	total including 300K pix of p - p @ 300 GeV, 100K pix of pi- - p @ 100 GeV, and 300K pix of pi- - p @ 375 GeV
Approval	22 Nov, 74	300 K Pix	in a combination of pi- and p bombardments at an energy greater than or equal to 300 GeV and with the understanding that following this run work with the wide gap chamber system will be terminated
Completed	28 Sep, 75	301 K Pix	of pi- - p interactions at 360 GeV/c

284 PARTICLE PRODUCTION #284 — **James K. Walker**

FERMILAB
NORTHEASTERN UNIVERSITY
NORTHERN ILLINOIS UNIVERSITY

BEAM: Proton Area - West
SURVEY OF PARTICLE PRODUCTION IN PROTON COLLISIONS AT NAL.
(Continuation of work begun in exp #63A.)

Request	19 Feb, 74	Unspecified	
Approval	26 Jun, 74	750 Hours	divided roughly as 150 hours for setup and testing and 150 hours each at the four energies of 100, 200, 300, and 400 GeV
Completed	3 Oct, 76	1,150 Hours	

285 SUPER-HEAVY ELEMENTS #285 — **Leon M. Lederman**

COLUMBIA UNIVERSITY
FERMILAB

BEAM: Neutrino Area - Miscellaneous
A SEARCH FOR A NEW STATE OF MATTER IN THE ANALYSIS OF AN NAL BEAM DUMP.

Request	21 Feb, 74	Target Exposure(s)
Approval	27 Feb, 74	Target Exposure(s)
Completed	2 Aug, 76	3 Targets Exposed

288 DI-LEPTON #288 — **Leon M. Lederman**

COLUMBIA UNIVERSITY
FERMILAB
SUNY AT STONY BROOK

BEAM: Proton Area - Center
A STUDY OF DI-LEPTON PRODUCTION IN PROTON COLLISIONS AT NAL.
(Formerly known as exp #70 III.)

Request	21 Feb, 74	Unspecified	
	10 May, 76	1,500 Hours	additional for mu-mu II
	10 Nov, 77	4,500 Hours	with a request for an additional 3,000 hours for high intensity and high resolution studies
Approval	18 Jan, 74	1,000 Hours	
	17 Nov, 76	2,500 Hours	with additional 1,500 hours not to extend beyond 1 Sep 1977
	16 Nov, 77	5,500 Hours	with an extension of about 3,000 hours until August 1978, and with a request for a progress report in May 1978
Completed	23 Jul, 78	6,850 Hours	

289 PROTON-HELIUM SCATTERING #289 — **Ernest I. Malamud**

UNIVERSITY OF ARIZONA
FERMILAB
JINR, DUBNA (RUSSIA)

BEAM: Internal Target Area (C-0)
SMALL ANGLE PROTON-HELIUM ELASTIC AND INELASTIC SCATTERING FROM 8 TO 500 GEV.
(Using an internal proton beam with a gas jet target.)

Request	1 Mar, 74	700 Hours	
Approval	22 Mar, 74	700 Hours	conditional upon successful development of the helium jet technique
Completed	8 Nov, 77	1,050 Hours	

290 BACKWARD SCATTERING #290 — **Winslow F. Baker**

UNIVERSITY OF ARIZONA
FERMILAB

BEAM: Meson Area - M6 Beam
BACKWARD PION-PROTON ELASTIC SCATTERING.
(For u from 0 - 0.8.)

Request	6 Mar, 74	1,100 Hours	including 200 hours for testing
Approval	22 Nov, 74	900 Hours	
Completed	31 Jul, 78	1,500 Hours	

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292 EMULSION/PROTONS @ 400 #292 — **Kurt Gottfried**

IAP, BUCHAREST (ROMANIA)
CERN (SWITZERLAND)
CORNELL UNIVERSITY
UNIVERSITY OF LUND (SWEDEN)

BEAM: Neutrino Area - Miscellaneous
MULTIPARTICLE PRODUCTION IN NUCLEI BY PROTONS OF SEVERAL HUNDRED GEV.
(Using target materials consisting of fine wires imbedded in emulsion or foils covering the emulsion; 400 GeV exposure.)

Request	30 Nov, 73	Emulsion Exposure	
Approval	16 Jan, 74	Emulsion Exposure	
Completed	9 Dec, 75	12 Stack(s)	

295 30-INCH PI+ & P - D @ 200 #295 — **Gideon Yekutieli**

CRN, STRASBOURG (FRANCE)
FERMILAB
WEIZMANN INSTITUTE (ISRAEL)

BEAM: Neutrino Area - 30 in. Hadron Beam
A STUDY OF PI+ - D INTERACTIONS AT 200 GEV/C IN THE 30-INCH BUBBLE CHAMBER AT NAL.

Request	15 Mar, 74	50 K Pix	of p - d @ 205 GeV
	14 Aug, 74	150 K Pix	total including an additional 50K pix due to decreased yield of pi+ - d events
Approval	21 Mar, 74	100 K Pix	in bare chamber with downstream chamber data if it can be arranged; and with request that interest be switched from p - d to pi+ - d bombardment
	27 Aug, 74	150 K Pix	with additional 50K pix to yield the requested number of pi+ - d
Completed	2 Nov, 75	156 K Pix	

297 QUARK #297 — **Lawrence B. Leipuner**

BROOKHAVEN NATIONAL LABORATORY

BEAM: Neutrino Area - 30 in. Hadron Beam
QUARK SEARCH USING 400-500 GEV PROTONS.
(By measuring ionization energy loss.)

Request	15 Apr, 74	24 Hours	with beam of 5 x 10 to the 4th particles/pulse and a 200 msec spill
Approval	15 May, 74	24 Hours	
Completed	10 Jul, 74	50 Hours	

299 30-INCH HYBRID #299 — **Irwin A. Pless**

BROWN UNIVERSITY
UNIVERSITY OF CAMBRIDGE (ENGLAND)
FERMILAB
ILLINOIS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
INDIANA UNIVERSITY
JOHNS HOPKINS UNIVERSITY
UNIVERSITY OF L'ETAT (BELGIUM)
MASSACHUSETTS INST. OF TECHNOLOGY
SUNY AT ALBANY
NIJMEGEN UNIVERSITY (NETHERLANDS)
OAK RIDGE NATIONAL LABORATORY
RUTGERS UNIVERSITY
STEVENS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF TENNESSEE, KNOXVILLE
YALE UNIVERSITY

BEAM: Neutrino Area - 30 in. Hadron Beam
PRECISION STUDY OF HIGH ENERGY COLLISIONS INDUCED BY INCIDENT 150 GEV/C PIONS AND PROTONS.
(Using the downstream PWC hybrid system.)

Request	16 May, 74	1,200 K Pix	at 150 GeV equally split between study of p - p, pi- - p, and pi+ - p interactions
Approval	22 Nov, 74	600 K Pix	of pi- - p, p - p, and pi+ - p interactions at 150 GeV/c
	6 Aug, 76	500 K Pix	to be pi+ - p @ 150 GeV/c in 30-inch bubble chamber with PWC hybrid system and with 100K pix of pi- - p now included in approval for exp# 393
	28 Oct, 76	660 K Pix	with additional 160K pix from a collaboration with proposal #375 to provide an overall package of 500K pix to be taken in an enriched K+ mode; 160K pix already taken at this time
Completed	22 Nov, 76	431 K Pix	with 229K pix remaining to be taken under earlier approval when declared complete on 29 Jun 1977

300 PARTICLE SEARCH #300 — **Pierre A. Piroue**

UNIVERSITY OF CHICAGO
PRINCETON UNIVERSITY

BEAM: Proton Area - East
STUDY OF PARTICLE PRODUCTION AT HIGH TRANSVERSE MOMENTA USING HYDROGEN AND DEUTERIUM TARGETS.

Request	16 May, 74	1,200 Hours	with a liquid hydrogen/deuterium target and at beam energies of 200, 300, 400, and 500 GeV
Approval	26 Jun, 74	600 Hours	with hydrogen target
Completed	24 Apr, 76	750 Hours	

305 NEUTRON DISSOCIATION #305 — **Bruno Gobbi**

FERMILAB
NORTHWESTERN UNIVERSITY
UNIVERSITY OF ROCHESTER
SLAC

BEAM: Meson Area - M3 Beam
PROPOSAL TO STUDY THE COHERENT DISSOCIATION OF NEUTRONS.
(A continuation of work begun in exp #27A.)

Request	22 May, 74	1,200 Hours	total to include one month of running every four months through calendar 1975
Approval	26 Jun, 74	900 Hours	without approval for the installation of the transmission target for H2 and D2 cross section measurements
	16 Dec, 74	1,200 Hours	with additional 300 hours for particle search
Completed	14 Apr, 75	1,400 Hours	

310 NEUTRINO #310 — **David B. Cline**

FERMILAB
HARVARD UNIVERSITY
UNIVERSITY OF PENNSYLVANIA
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Neutrino Area - Wide Band Horn
FURTHER STUDY OF HIGH ENERGY NEUTRINO INTERACTIONS AT FERMILAB.

Request	4 Jun, 74	Unspecified	
	1 Feb, 78	1,200 Hours	to include 2 x 10 to the 18th protons on target with the Wide Band Horn system focused for negatives without a plug and 2 x 10 to the 18th for positives
Approval	22 Nov, 74	1,000 Hours	with a formal approval for 2 x 10 to the 18th protons and the understanding that use will be made of a horn focusing system
	17 Nov, 76	1,000 Hours	to also include running with the Quadrupole Triplet train for an exposure of 1 x 10 to the 18th protons during December 1976
	15 Mar, 77	2,500 Hours	with formal additional approval as follows--1 - 2 x 10 to the 18th protons using the sign-selected-bare-target train understood to focus antineutrinos, and 2 x 10 to the 18th protons using the Quadrupole Triplet train load
	21 Mar, 78	3,500 Hours	with additional approval for a final run to complete the experiment during wide-band horn running for the 15-ft bubble chamber
Completed	31 Aug, 78	3,800 Hours	at the request of the experimenters, because it was felt that the conditions required to properly continue the experiment could not be met.

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311 30-INCH PBAR - P @ 100 #311 — **William W. Neale**

UNIVERSITY OF CAMBRIDGE (ENGLAND)
FERMILAB
MICHIGAN STATE UNIVERSITY

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL TO STUDY MULTIPARTICLE PRODUCTION IN HIGH ENERGY ANTIPROTON-PROTON INTERACTIONS WITH THE FERMILAB 30-INCH BUBBLE CHAMBER.

Request	6 Jun, 74	100 K Pix with equal numbers of pbar and pi-
Approval	26 Jun, 74	100 K Pix to be obtained with not more than 200K pulses of the chamber
Completed	27 Jan, 75	98 K Pix

313 PROTON-PROTON POLARIZATION #313 — **Homer A. Neal**

INDIANA UNIVERSITY

BEAM: Internal Target Area (C-0)
POLARIZATION IN P - P ELASTIC, INELASTIC AND INCLUSIVE REACTIONS AT FERMILAB ENERGIES.
(Using a gas jet target with hydrogen, the internal proton beam, the spectrometer of exp #198A, and a new carbon polarimeter.)

Request	5 Jun, 74	1,500 Hours total with two jet pulses per cycle
Approval	26 Jun, 74	1,000 Hours with about 800 hours of running on polarization in elastic scattering and about 200 hours of running to observe polarization in inelastic channels
	15 Mar, 77	1,000 Hours with encouragement to use some of the remaining running to accumulate further data on polarization in inelastic processes; see proposal #522
Completed	30 Mar, 77	850 Hours with some approved running remaining; see exp #522

317 PROTON-NUCLEON INELASTIC #317 — **Rodney L. Cool**

UNIVERSITY OF ARIZONA
FERMILAB
JINR, DUBNA (RUSSIA)
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY

BEAM: Internal Target Area (C-0)
PROTON DIFFRACTION DISSOCIATION ON HYDROGEN AND DEUTERIUM.
(Using the gas jet target and internal proton beam.)

Request	7 Jun, 74	800 Hours for tests and data taking
Approval	3 Jul, 74	800 Hours using gas jet with running to be interleaved with exp# 321
Completed	1 Nov, 75	1,400 Hours

319 MUON #319 — **K. Wendell Chen**

FERMILAB
MICHIGAN STATE UNIVERSITY

BEAM: Neutrino Area - Muon/Hadron Beam
FURTHER TEST OF SCALING AT HIGH MOMENTUM TRANSFERS IN DEEP INELASTIC MUON SCATTERING.
(A continued exploration of the studies begun in exp #26.)

Request	10 Jun, 74	1,100 Hours
Approval	26 Mar, 75	500 Hours for a scaling test at high energies
Completed	20 Sep, 76	900 Hours

320 NEUTRINO #320 — **Frank Sciulli**

CALIFORNIA INSTITUTE OF TECHNOLOGY
FERMILAB

BEAM: Neutrino Area - Dichromatic
PROPOSAL TO MEASURE NEUTRAL CURRENT CROSS-SECTIONS AND ASSOCIATED INELASTIC DISTRIBUTIONS IN THE NARROW-BAND BEAM.

Request	10 Jun, 74	1,200 Hours with request of 3 x 10 to the 18th protons total and initial run of 1 x 10 to the 18th protons for investigation
Approval	26 Jun, 74	500 Hours with a formal approval for 1 x 10 to the 18th protons pending a positive finding of neutral currents and with the inclination to assign higher priority for running to exp# 320 than to completion of exp# 21
Completed	1 Oct, 74	500 Hours

321 PROTON-PROTON INELASTIC #321 — **Juliet Lee-Franzini**

COLUMBIA UNIVERSITY
SUNY AT STONY BROOK

BEAM: Internal Target Area (C-0)
A HIGH PRECISION EXPERIMENT TO MEASURE THE INELASTIC P - P CROSS SECTION AND ITS ASSOCIATED FORWARD MULTIPLICITIES AT SMALL MOMENTUM TRANSFER.
(Using a new hydrogen gas jet target and the internal proton beam.)

Request	11 Jun, 74	2,000 Hours total including 800 hours for testing
Approval	3 Jul, 74	800 Hours with running to be interleaved with exp# 317 and using the existing cryogenic hydrogen jet
	26 Mar, 75	800 Hours with approval to use a room temperature gas jet of their own design
Completed	20 Sep, 76	1,900 Hours

324 INCLUSIVE SCATTERING #324 — **Howard L. Weisberg**

UNIVERSITY OF PENNSYLVANIA

BEAM: Meson Area - M1 Beam
A PROPOSAL TO STUDY SINGLE PARTICLE INCLUSIVE SPECTRA IN HIGH ENERGY HADRON-HADRON COLLISIONS

Request	11 Apr, 74	1,000 Hours
Approval	24 Jun, 74	500 Hours
Completed	13 Aug, 77	1,200 Hours

325 PARTICLE SEARCH #325 — **Pierre A. Piroue**

UNIVERSITY OF CHICAGO
PRINCETON UNIVERSITY

BEAM: Proton Area - East
STUDY OF DI-MUON PRODUCTION AT HIGH TRANSVERSE MOMENTA.

Request	12 Jun, 74	Parasitic Running
Approval	25 Nov, 74	Parasitic Running with the stipulation that this running time will be concurrent with the previously approved 600 hours for exp# 300
	6 May, 76	600 Hours for a portion of the program estimated to require 13 weeks and with the expectation to continue the experiment during another running period
	26 Oct, 76	1,200 Hours during a six-week running period to begin in January 1977
Completed	28 Feb, 77	1,500 Hours

326 DI-MUON #326 — **Melvyn Jay Shochet**

UNIVERSITY OF CHICAGO
PRINCETON UNIVERSITY

BEAM: Proton Area - West
PROPOSAL TO MEASURE MUON PAIRS PRODUCED AT HIGH TRANSVERSE MOMENTUM BY PIONS.

Request	29 May, 74	Unspecified
	7 Jul, 75	400 Hours
	2 Feb, 77	800 Hours to be run in conjunction with exp #258 in the P-West pion beam by adding a second arm to the exp #258 spectrometer
Approval	15 Mar, 77	800 Hours
Completed	26 Apr, 82	2,000 Hours

327 DETECTOR DEVELOPMENT #327 — **Wade W. M. Allison**

MASSACHUSETTS INST. OF TECHNOLOGY
UNIVERSITY OF OXFORD (ENGLAND)

BEAM: Neutrino Area - Miscellaneous
PROPOSAL TO TEST PARTICLE IDENTIFICATION BY IONIZATION LOSS (ISIS).

Request	15 Jul, 74	400 Hours
Approval	31 Jul, 74	50 Hours
Completed	7 Feb, 75	50 Hours

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328 EMULSION/PI- @ 200 #328 — **M. I. Tretjakova** — LEBEDEV PHYSICAL INST. (RUSSIA)
BEAM: Neutrino Area - Miscellaneous
PROPOSAL TO STUDY THE INTERACTIONS OF PI- MESONS IN NUCLEAR EMULSION AT THE FERMILAB ACCELERATOR.

Request	5 Aug, 74	Emulsion Exposure
Approval	5 Aug, 74	Emulsion Exposure
Completed	7 Oct, 74	5 Stack(s)

329 EMULSION/PROTONS @ 300 #329 — **M. I. Tretjakova** — LEBEDEV PHYSICAL INST. (RUSSIA)
BEAM: Neutrino Area - Miscellaneous
PROPOSAL TO STUDY THE INTERACTIONS OF PROTONS IN NUCLEAR EMULSION AT THE FERMILAB ACCELERATOR.

Request	5 Aug, 74	Emulsion Exposure
Approval	3 Jun, 75	Emulsion Exposure
Completed	10 Jun, 75	2 Stack(s)

330 PARTICLE SEARCH #330 — **H. Richard Gustafson** — UNIVERSITY OF MICHIGAN
BEAM: Meson Area - M4 Beam
SEARCH FOR MASSIVE NEUTRAL PARTICLES.
(Using time-of-flight and a total absorption calorimeter.)

Request	6 Aug, 74	1,300 Hours to include 800 hours for tuneup parasitic to exp #305 and 500 hours for data
Approval	22 Jan, 75	100 Hours
Completed	7 Jul, 75	150 Hours

331 DI-MUON #331 — **James E. Pilcher** — UNIVERSITY OF CHICAGO; PRINCETON UNIVERSITY
BEAM: Neutrino Area - Muon/Hadron Beam
PROPOSAL FOR A DETAILED STUDY OF DI-MUON PRODUCTION.
(Alternative version of exps #308 & #323 designed for muon laboratory cyclotron spectrometer.)

Request	10 Aug, 74	Unspecified
Approval	25 Nov, 74	400 Hours for an initial run at an incident beam intensity of about 10 to the 6th particles/pulse
Completed	22 Mar, 76	1,400 Hours

335 MUON SEARCH #335 — **Orrin D. Fackler** — CALIFORNIA INSTITUTE OF TECHNOLOGY; UNIVERSITY OF CHICAGO; FERMILAB; PRINCETON UNIVERSITY; ROCKEFELLER UNIVERSITY
BEAM: Meson Area - M1 Beam
A SEARCH FOR DIRECT MUON PRODUCTION IN THE FORWARD DIRECTION.

Request	18 Aug, 74	200 Hours total including time for tests and data
Approval	22 Nov, 74	200 Hours provided that this running time can be arranged in such a way as not to interfere substantially with the ongoing physics program in the M1 beam line
Completed	6 Jun, 75	300 Hours

336 EMULSION/PROTONS @ 400 #336 — **Takeshi Ogata** — KWANSEI GAKUIN UNIVERSITY (JAPAN)
BEAM: Neutrino Area - Miscellaneous
MULTIPARTICLE PRODUCTION IN NUCLEON-NUCLEUS COLLISIONS AT 400 GEV.

Request	9 Sep, 74	Emulsion Exposure
Approval	19 Oct, 74	Emulsion Exposure
Completed	9 Dec, 75	2 Stack(s)

337 DI-MUON #337 — **David P. Eartly** — FERMILAB; MAX-PLANCK INSTITUTE (GERMANY)
BEAM: Meson Area - Miscellaneous
MEASUREMENT OF DI-MUON EVENTS IN THE MESON AREA.

Request	20 Sep, 74	3 Hours
Approval	27 Sep, 74	3 Hours
Completed	7 Feb, 75	5 Hours

338 30-INCH PI- - D @ 360 #338 — **Keihachiro Moriyasu** — UNIV. OF CALIFORNIA, DAVIS; INP, KRAKOW (POLAND); WARSAW UNIVERSITY, INP, (POLAND); UNIVERSITY OF WASHINGTON
BEAM: Neutrino Area - 30 in. Hadron Beam
PION-DEUTERON INTERACTIONS AT 400 GEV/C.

Request	21 Sep, 74	100 K Pix
Approval	24 Sep, 74	50 K Pix in bare chamber with downstream chamber data if it can be arranged
Completed	28 Aug, 76	53 K Pix

339 EMULSION/PI- @ 200 #339 — **Wladyslaw Wolter** — INP, KRAKOW (POLAND)
BEAM: Neutrino Area - Miscellaneous
CRACOW EMULSION EXPOSURE TO 200 GEV PIONS.

Request	12 Sep, 74	Emulsion Exposure
Approval	1 Oct, 74	Emulsion Exposure
Completed	9 Jun, 75	4 Stack(s)

340 EMULSION/ELECTRONS @ HI E #340 — **Shoji Dake** — KOBE UNIVERSITY (JAPAN); KONAN UNIVERSITY (JAPAN); SAITAMA UNIVERSITY (JAPAN); UNIVERSITY OF TOKYO (JAPAN); UTSUNOMIYA UNIVERSITY (JAPAN); WASEDA UNIVERSITY (JAPAN)
BEAM: Proton Area - Miscellaneous
STUDY OF THE ELECTRON-PHOTON CASCADE SHOWER IN LEAD ABSORBER.

Request	25 Sep, 74	Emulsion Exposure
Approval	10 Oct, 74	Emulsion Exposure
Completed	5 Oct, 76	10 Stack(s)

341 15-FOOT P - P @ 400 #341 — **Winston Ko** — UNIV. OF CALIFORNIA, DAVIS; LAWRENCE BERKELEY LABORATORY
BEAM: Neutrino Area - 15 ft. Hadron Beam
INTERACTIONS OF PI+ MESONS AND PROTONS IN A HYDROGEN-NEON MIXTURE.

Request	1 Oct, 74	100 K Pix
Approval	4 Dec, 74	25 K Pix of tagged pi+ and p at 150 GeV in H2 to develop analysis techniques for 15-foot bubble chamber film
	8 Dec, 75	25 K Pix of p - p interactions at 400 GeV
Completed	21 Dec, 75	34 K Pix

343 15-FOOT P - P @ 300 #343 — **Roderich J. Engelmann** — ARGONNE NATIONAL LABORATORY; UNIVERSITY OF KANSAS; SUNY AT STONY BROOK; TUFTS UNIVERSITY
BEAM: Neutrino Area - 15 ft. Hadron Beam
PROPOSAL TO STUDY NEUTRAL PARTICLE PRODUCTION IN 250 GEV P - P INTERACTIONS IN THE FERMILAB 15-FOOT BUBBLE CHAMBER.

Request	3 Oct, 74	25 K Pix
Approval	4 Dec, 74	25 K Pix
Completed	13 Jan, 76	27 K Pix

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344 30-INCH PBAR - P @ 50 #344 — **Laszlo J. Gutay**

CNTRL RES INST, BUDAPEST (HUNGARY)
FERMILAB
PURDUE UNIVERSITY

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL TO SURVEY CENTRAL COLLISIONS IN PBAR - P TO MESONS BETWEEN 30 AND 60 GEV/C IN THE 30-INCH BUBBLE CHAMBER AT FERMILAB.

Request	4 Oct, 74	100 K Pix	to be taken in < 200K chamber expansions
Approval	27 Nov, 74	100 K Pix	with the qualification that it must be possible to obtain these pictures in no more than one calender month of running time
Completed	1 Nov, 76	145 K Pix	

345 30-INCH PBAR - D @ 100 #345 — **Gosta Ekspong**

UNIVERSITY OF LIVERPOOL (ENGLAND)
UNIVERSITY OF STOCKHOLM (SWEDEN)
VANDERBILT UNIVERSITY

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL TO STUDY MULTIPARTICLE PRODUCTION IN 100 GEV/C ANTI-PROTON-DEUTERIUM INTERACTIONS WITH THE FERMILAB 30-INCH BUBBLE CHAMBER.

Request	5 Oct, 74	100 K Pix	with a Cerenkov tagged incoming beam
Approval	4 Dec, 74	100 K Pix	with the qualification that serious consideration be given to the use* of the PWC downstream system
Completed	7 Sep, 76	61 K Pix	with 39K pix remaing to be taken under earlier approval when declared complete on 29 Jun 1977

346 EMULSION/PROTONS @ 400 #346 — **Gosta Ekspong**

UNIVERSITY OF STOCKHOLM (SWEDEN)

BEAM: Neutrino Area - Miscellaneous
SEARCH FOR HEAVY, SHORTLIVED PARTICLES.

Request	6 Oct, 74	Emulsion Exposure	
Approval	21 Oct, 74	Emulsion Exposure	
Completed	9 Dec, 75	1 Stack(s)	

350 INCLUSIVE NEUTRAL MESON #350 — **Robert W. Kenney**

BROOKHAVEN NATIONAL LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
LAWRENCE BERKELEY LABORATORY

BEAM: Meson Area - M2 Beam
A PROPOSAL TO STUDY NEUTRAL PIONS AND MESON INCLUSIVE PRODUCTION WITH INCIDENT NEGATIVE PIONS IN THE TRIPLE REGGE REGION.
(Using the photon detector of exp #111.)

Request	11 Oct, 74	500 Hours	
Approval	21 Nov, 74	400 Hours	
	16 Dec, 74	400 Hours	with up to 150 hours approved for a particle search with the condition that this time be included within the 900 hours already approved for for exps# 268 and 350
Completed	24 Feb, 77	900 Hours	

356 NEUTRINO #356 — **Frank Sciulli**

CALIFORNIA INSTITUTE OF TECHNOLOGY
FERMILAB
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY

BEAM: Neutrino Area - Dichromatic
STUDIES OF DEEP INELASTIC DIFFERENTIAL DISTRIBUTIONS AT HIGH ENERGIES FOR NEUTRINO AND ANTI-NEUTRINO BEAMS.
(A continuation of the work begun in exp #21A with a new narrow band beam and changed apparatus.)

Request	18 Oct, 74	1,000 Hours	
Approval	22 Nov, 74	1,000 Hours	with a formal commitment of 2 x 10 to the 18th protons contingent on the feasibility of developing the improved Dichromatic beam
Completed	17 Jan, 79	1,350 Hours	

357 PARTICLE SEARCH #357 — **Donald I. Meyer**

FERMILAB
UNIVERSITY OF MICHIGAN
PURDUE UNIVERSITY

BEAM: Meson Area - M2 Beam
A PROPOSAL TO SEARCH FOR CHARMED PARTICLES AND MEASUREMENTS OF TWO-PARTICLE INCLUSIVE CROSS SECTIONS AT LARGE P-TRANSVERSE.
(Employing a two-arm magnetic spectrometer.)

Request	19 Oct, 74	2,400 Hours	
Approval	16 Dec, 74	600 Hours	
Completed	7 Jun, 76	1,700 Hours	

358 DI-MUON #358 — **Wonyong Lee**

COLUMBIA UNIVERSITY
CORNELL UNIVERSITY
FERMILAB
UNIVERSITY OF HAWAII AT MANOA
UNIVERSITY OF ILLINOIS, CHAMPAIGN

BEAM: Proton Area - East
DI-MUON PRODUCTION BY NEUTRONS.

Request	20 Oct, 74	Unspecified	
Approval	27 Nov, 74	300 Hours	of neutron running to be interleaved within the 600 hours already approved for exp# 87A
Completed	1 Oct, 75	400 Hours	

361 LAMBDA BETA-DECAY #361 — **Lee G. Pondrom**

UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M2 Beam
PRECISION MEASUREMENT OF LAMBDA BETA DECAY PARAMETERS.
(Will run with experimental set-up for neutral hyperon #8.)

Request	14 Nov, 74	300 Hours	
	23 Jan, 76	350 Hours	total including 150 hours in unpolarized lambda-zero beam and 200 hours in polarized lambda-zero beam
Approval	15 Nov, 77	300 Hours	
Completed	29 Oct, 79	1,250 Hours	

362 EMULSION/PI- @ 200 #362 — **Piyare L. Jain**

SUNY AT BUFFALO

BEAM: Neutrino Area - Miscellaneous
INTERACTION OF 200 - 400 GEV PIONS WITH EMULSION NUCLEI.

Request	15 Nov, 74	Emulsion Exposure	
Approval	25 Nov, 74	Emulsion Exposure	
Completed	9 Jun, 75	1 Stack(s)	

363 PARTICLE SEARCH #363 — **Stephen L. Olsen**

FLORIDA STATE UNIVERSITY
IMPERIAL COLLEGE (ENGLAND)
UNIVERSITY OF ROCHESTER
RUTGERS UNIVERSITY

BEAM: Internal Target Area (C-0)
A PROPOSAL TO SEARCH FOR CHARMED PARTICLE PRODUCTION NEAR THRESHOLD.

Request	24 Nov, 74	Unspecified	
Approval	16 Dec, 74	500 Hours	of running with the rotating carbon filament target
Completed	9 Apr, 75	650 Hours	

365 PARTICLE SEARCH #365 — **David A. Garelick**

NORTHEASTERN UNIVERSITY

BEAM: Meson Area - M2 Beam
A PROPOSAL TO SEARCH FOR THE PRODUCTION OF CHARMED MESONS IN PI - P INTERACTIONS.

Request	27 Nov, 74	200 Hours	including 40 hours for testing
Approval	31 Dec, 74	200 Hours	during a two week run with a passive, nonmagnetized steel absorber to be used in conjunction with a muon trigger
Completed	5 Feb, 75	200 Hours	

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366 PARTICLE SEARCH #366 — **Maris A. Abolins**

BEAM: Meson Area - M3 Beam
STUDY OF HEAVY, NARROW MESONS USING A MASS-FOCUSING SPECTROMETER.
(Experiment consists mainly of rearranged components from exp #12.)

CARELTON UNIVERSITY (CANADA)
FERMILAB
MICHIGAN STATE UNIVERSITY
OHIO STATE UNIVERSITY

Request	27 Nov, 74	Unspecified	
Approval	16 Dec, 74	600 Hours	for a particle search to be slanted particularly toward an identification of charmed mesons
	24 Nov, 75	1,200 Hours	with an additional 600 hours to explore the possibility of a mass peak in the K- pi+ mass spectrum
Completed	2 Jul, 76	2,500 Hours	

369 PARTICLE SEARCH #369 — **Thomas B. W. Kirk**

BEAM: Neutrino Area - Muon/Hadron Beam
A SEARCH FOR CHARMED PARTICLES.
(Using the spectrometer originally developed for exp #98.)

FERMILAB
HARVARD UNIVERSITY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
MAX-PLANCK INSTITUTE (GERMANY)
TUFTS UNIVERSITY

Request	9 Dec, 74	700 Hours	for data with 300 pulses/hour and 1 x 10 to the 6th pi-/pulse
Approval	17 Mar, 76	600 Hours	
Completed	13 Aug, 77	1,000 Hours	

370 NEUTRINO #370 — **David B. Cline**

BEAM: Neutrino Area - Quadrupole Triplet
CONTINUED SEARCH FOR NEW PARTICLE PRODUCTION USING THE EXP #1A DETECTOR.

FERMILAB
HARVARD UNIVERSITY
UNIVERSITY OF PENNSYLVANIA
UNIVERSITY OF WISCONSIN-MADISON

Request	9 Dec, 74	500 Hours	with a total of 1 x 10 to the 18th protons and a 1 msec spill
Approval	7 Jul, 75	500 Hours	with the hope of providing 1 x 10 to the 18th protons
Completed	19 Mar, 75	400 Hours	

371 SUPER-HEAVY ELEMENTS #371 — **Mira Juric**

BEAM: Meson Area - Miscellaneous
INVESTIGATION OF THE PRODUCTION OF HEAVY FRAGMENTS INDUCED BY PARTICLES OF HIGH ENERGIES.

UNIVERSITY OF BELGRADE(YUGOSLAVIA)

Request	2 Dec, 74	Target Exposure(s)	
Approval	12 Mar, 75	Target Exposure(s)	
Completed	20 Dec, 75	2 Stack(s)	

373 EMULSION/MUONS @ 200 #373 — **Piyare L. Jain**

BEAM: Neutrino Area - Miscellaneous
INTERACTION OF 50 - 100 GEV MUONS WITH EMULSION NUCLEI.

SUNY AT BUFFALO

Request	8 Jul, 75	Emulsion Exposure	
Approval	24 Sep, 76	Emulsion Exposure	to muons @ 225 GeV/c and with an intensity not to exceed 50K particles/sq cm
Completed	22 Nov, 76	2 Stack(s)	

374 EMULSION/PROTONS @ 300 #374 — **D. H. Davis**

BEAM: Neutrino Area - Miscellaneous
A PROPOSAL TO SEARCH FOR CHARMED PARTICLES ORIGINATING FROM INTERACTIONS OF 300 GEV/C PROTONS IN EMULSION NUCLEI.

UNIVERSITY OF BELGRADE(YUGOSLAVIA)
UNIV. COLLEGE DUBLIN (IRELAND)
INP, KRAKOW (POLAND)
UNIVERSITY OF LIBRE (BELGIUM)
LONDON UNIVERSITY COLLEGE(ENGLAND)
THE OPEN UNIVERSITY (ENGLAND)
INFN, ROME (ITALY)
UNIVERSITY OF STRASBOURG (FRANCE)
WARSAW UNIVERSITY, INP, (POLAND)

Request	25 Jan, 74	Emulsion Exposure	
Approval	12 Mar, 75	Emulsion Exposure	with the understanding that exp# 374 will replace exp# 364
Completed	10 Jun, 75	1 Stack(s)	

379 PARTICLE SEARCH #379 — **Stanley G. Wojcicki**

BEAM: Neutrino Area - 15 ft. Hadron Beam
SEARCH FOR SHORT LIVED STATES DECAYING WEAKLY VIA LEPTONIC MODES.

CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIVERSITY OF ROCHESTER
STANFORD UNIVERSITY

Request	5 Feb, 75	1,000 Hours	
Approval	26 Mar, 75	200 Hours	for testing and initial data taking
	17 Nov, 76	600 Hours	with 400 hours for high priority running and with the expectation that a second 400 hour run will be approved if preliminary analysis of initial results are satisfactory
	15 Mar, 77	600 Hours	with a hope of combining the two requested running periods into a single block of running but with the understanding that the total number of hours would be somewhat less than requested
Completed	8 Jun, 77	1,250 Hours	

380 15-FOOT NEUTRINO/H2&NE #380 — **Charles Baltay**

BEAM: Neutrino Area - Dichromatic
STUDY OF THE PROPERTIES OF WEAK NEUTRAL CURRENTS IN THE INTERACTIONS OF A NARROW BAND NEUTRINO BEAM IN LIQUID NEON.

BROOKHAVEN NATIONAL LABORATORY
COLUMBIA UNIVERSITY

Request	6 Feb, 75	200 K Pix	
Approval	7 Jul, 75	200 K Pix	in a heavy neon-hydrogen mixture contingent upon the construction and adequate performance of an improved narrow-band beam
	24 Jun, 77	200 K Pix	at higher energies using the D C Dichromatic train; new requests for use of the Dichromatic horn to be considered later
Completed	31 Oct, 79	196 K Pix	

381 PROTON-NUCLEON SCATTERING #381 — **Ernest I. Malamud**

BEAM: Internal Target Area (C-0)
MEASUREMENT OF THE REAL PART OF THE P - N AND P - P FORWARD SCATTERING AMPLITUDES; PRODUCTION OF LOW MASS ISOBARS IN THE VERY SMALL MOMENTUM TRANSFER REGION.
(Uses gas jet target.)

UNIVERSITY OF ARIZONA
FERMILAB
JINR, DUBNA (RUSSIA)
UNIVERSITY OF ROCHESTER

Request	20 Feb, 75	300 Hours	
Approval	26 Mar, 75	300 Hours	
Completed	30 Mar, 77	600 Hours	

382 PARTICLE SEARCH #382 — **Louis N. Hand**

BEAM: Neutrino Area - Muon/Hadron Beam
A SEARCH FOR CHARMED HADRONS PRODUCED BY MUON DEEP INELASTIC SCATTERING IN TAGGED NUCLEAR EMULSIONS.
(Using drift chambers to locate events and reduce scanning time.)

CORNELL UNIVERSITY
FERMILAB
INP, KRAKOW (POLAND)
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF WASHINGTON

Request	21 Feb, 75	Emulsion Exposure	
Approval	26 Mar, 75	Emulsion Exposure	with a provision that it does not seriously interfere with the rest of the muon and neutrino program
	24 Nov, 75	Emulsion Exposure	with a bombardment of five days duration during December 1975
Completed	19 Dec, 75	200 Hours	

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383 INCLUSIVE K-SHORT #383 — **Hans G. E. Kobrak**

BEAM: Meson Area - M4 Beam
A PROPOSAL TO STUDY THE INCLUSIVE PRODUCTION OF K ZERO SHORT BY K MINUS ON HYDROGEN.
(To use the M4 line as a charged beam at moments of 20 - 150 GeV/c.)

UNIV. OF CALIFORNIA, DAVIS
UNIV. OF CALIFORNIA, SAN DIEGO
CARELTON UNIVERSITY (CANADA)
MICHIGAN STATE UNIVERSITY

Request	24 Feb, 75	500 Hours	
Approval	29 Jun, 76	500 Hours	with 200 hours for setup and original run and 300 hours for final run
Completed	7 May, 78	2,200 Hours	

385 EMULSION/PROTONS @ 400 #385 — **Yog Prakash**

BEAM: Neutrino Area - Miscellaneous
PROPOSAL FOR EXPOSURE OF A STACK OF NUCLEAR EMULSIONS TO PROTONS OF 400 GEV/C.

DELHI UNIVERSITY (INDIA)
JAMMU UNIVERSITY (INDIA)
PANJAB UNIVERSITY (INDIA)
RAJASTHAN UNIVERSITY (INDIA)

Request	5 Mar, 75	Emulsion Exposure	
Approval	11 Mar, 75	Emulsion Exposure	
Completed	9 Dec, 75	1 Stack(s)	

386 EMULSION/NEW PARTICLES #386 — **Jere J. Lord**

BEAM: Neutrino Area - Miscellaneous
A SEARCH FOR LOW ENERGY NEUTRAL PARTICLES AND PARTICLE INTERACTIONS INVOLVING SMALL ENERGY EXCHANGES IN THE NEUTRINO BEAM.

UNIVERSITY OF WASHINGTON

Request	7 Mar, 75	Emulsion Exposure	
Approval	27 Mar, 75	Emulsion Exposure	
Completed	29 Dec, 76	1 Stack(s)	

387 EMULSION/PI- @ 200 #387 — **Richard J. Wilkes**

BEAM: Neutrino Area - Miscellaneous
100 TO 300 GEV PION INTERACTIONS IN EMULSION AND HEAVY ELEMENT TARGETS.

UNIVERSITY OF WASHINGTON

Request	7 Mar, 75	Emulsion Exposure	
Approval	13 May, 75	Emulsion Exposure	
Completed	9 Jun, 75	4 Stack(s)	

388 15-FOOT ANTI-NEUTRINO/H2&NE#388 — **Vincent Z. Peterson**

BEAM: Neutrino Area - Dichromatic
PROPOSAL TO STUDY NEUTRAL CURRENT NEUTRINO AND ANTI-NEUTRINO INTERACTIONS IN THE 15-FOOT BUBBLE CHAMBER USING THE EXTERNAL MUON IDENTIFIER AND A DICHROMATIC BEAM.

FERMILAB
UNIVERSITY OF HAWAII AT MANOA
LAWRENCE BERKELEY LABORATORY

Request	24 Apr, 75	200 K Pix	
	7 Jun, 78	500 K Pix	or 5 x 10 to the 18th protons
Approval	7 Jul, 75	200 K Pix	of antineutrino bombardment with a heavy neon-hydrogen mixture contingent upon the construction and adequate performance of an improved narrow-band beam; see proposal #455
	24 Jun, 77	200 K Pix	at higher energies using the D C Dichromatic train; new requests for use of the Dichromatic horn to be considered later
	28 Jun, 78	200 K Pix	with a decision to maintain the approval as it stands
Completed	12 Sep, 79	181 K Pix	

390 15-FOOT ANTI-NEUTRINO/D2 #390 — **Arthur F. Garfinkel**

BEAM: Neutrino Area - Wide Band Horn
ANTI-NEUTRINO INTERACTIONS IN THE DEUTERIUM-FILLED 15-FOOT BUBBLE CHAMBER.

ARGONNE NATIONAL LABORATORY
CARNEGIE-MELLON UNIVERSITY
PURDUE UNIVERSITY

Request	29 Apr, 75	300 K Pix	
Approval	7 Jul, 75	300 K Pix	
	28 Jun, 78	300 K Pix	with a total of 150K pix presently scheduled for the experiment during the fall 1978 run
	19 Mar, 79	250 K Pix	
Approved/Inactive	1 Apr, 79	10 K Pix	as of 1 Apr 1979

391 MUON #391 — **Leroy T. Kerth**

BEAM: Neutrino Area - Muon/Hadron Beam
EXPLORATION OF RARE MUON-INDUCED PROCESSES.

UNIV. OF CALIFORNIA, BERKELEY
FERMILAB
LAWRENCE BERKELEY LABORATORY
PRINCETON UNIVERSITY

Request	15 Feb, 75	Unspecified	
Approval	7 Jul, 75	Parasitic Running concurrent with exp# 203	
Completed	18 May, 78	Unspecified but for information on the total extent of run, see exp #203A	

395 HADRON JETS #395 — **Walter Selove**

BEAM: Meson Area - M2 Beam
CALORIMETER-ARRAY STUDY OF HIGH P-TRANSVERSE EVENTS.

LEHIGH UNIVERSITY
UNIVERSITY OF PENNSYLVANIA
UNIVERSITY OF WISCONSIN-MADISON

Request	21 May, 75	450 Hours	total including 150 hours of tests
Approval	7 Jul, 75	450 Hours	contingent upon the successful completion of the calorimeter tests planned for the M5 beam line
Completed	16 Nov, 77	1,150 Hours	

396 HADRON DISSOCIATION #396 — **Konstantin Goulianos**

BEAM: Meson Area - M6 Beam
ELASTIC SCATTERING AND DIFFRACTION DISSOCIATION AT SMALL MOMENTUM TRANSFER FOR PI+-, K+-, P, PBAR AND N.

ROCKEFELLER UNIVERSITY

Request	21 May, 75	1,000 Hours	
Approval	7 Jul, 75	600 Hours	for Phase I
Completed	23 Nov, 77	1,200 Hours	

397 PARTICLE SEARCH #397 — **Jerome L. Rosen**

BEAM: Meson Area - M3 Beam
PROPOSAL TO SEARCH FOR HIGH MASS PARTICLES PRODUCED IN ASSOCIATION WITH PROMPT MUONS.
(Using the spectrometer from exps #27A and #305 with additions.)

FERMILAB
NORTHWESTERN UNIVERSITY
UNIVERSITY OF ROCHESTER
SLAC

Request	21 May, 75	1,000 Hours	
Approval	9 Jul, 75	500 Hours	
	18 May, 76	1,000 Hours	including an additional running period of approximately 5 weeks duration during the summer of 1976
Completed	18 Aug, 76	1,150 Hours	

398 MUON #398 — **Richard Wilson**

BEAM: Neutrino Area - Muon/Hadron Beam
A PROPOSAL FOR A FURTHER STUDY OF MUON NUCLEON INELASTIC SCATTERING AT FERMILAB.
(Using the spectrometer of exp #98.)

UNIVERSITY OF CHICAGO
HARVARD UNIVERSITY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
UNIVERSITY OF OXFORD (ENGLAND)
VIRGINIA POLYTECHNIC INSTITUTE

Request	21 May, 75	800 Hours	
Approval	7 Jul, 75	800 Hours	of H2 and D2 running with the expectation that some of this running can occur concurrently with exp #319, at which time priority will be given to exp# 319
Completed	1 Dec, 76	1,100 Hours	

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399 EMULSION/ELECTRONS @ > 100 #399 — **Robert L. Golden**

JOHNSON SPACE CENTER (NASA)
KANAGAWA UNIVERSITY (JAPAN)
ISAS, TOKYO UNIVERSITY (JAPAN)
UNIVERSITY OF WASHINGTON

BEAM: Proton Area - Miscellaneous
PRODUCTION OF ELECTROMAGNETIC CASCADE SHOWERS BY SEVERAL HUNDRED GEV ELECTRONS IN EMULSION CHAMBERS.

Request	5 May, 75	1,000 Emulsion Exposure
Approval	19 Jun, 75	Emulsion Exposure to electrons with fluxes of 10, 1,000, and 200K/sq cm
Completed	5 Oct, 76	6 Stack(s)

400 PARTICLE SEARCH #400 — **James E. Wiss**

UNIVERSITY OF BOLOGNA (ITALY)
UNIVERSITY OF COLORADO AT BOULDER
FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
INFN, MILANO (ITALY)
UNIVERSITY OF MILANO (ITALY)
UNIVERSITY OF PAVIA (ITALY)
YALE UNIVERSITY

BEAM: Proton Area - East
A SEARCH FOR NEW PARTICLES PRODUCED IN ASSOCIATION WITH THE HADRONIC PRODUCTION OF PSI (3.1) MESONS.
(Using a proton beam of about 10 to the 7th into the zero degree neutral beam line and the spectrometer of exp #401/458 with additions.)

Request	22 May, 75	870 Hours
Approval	7 Jul, 75	400 Hours
	2 Jul, 76	400 Hours with a total of 1,000 hours approved for the combination of exps #400, #401, and #458
	14 Mar, 77	400 Hours with a total of 2,000 hours for the combination of exps #400,401 & 458
	1 Apr, 78	Unspecified since approved running time has been used by exp #87A
	7 Jul, 80	500 Hours
Completed	14 Jul, 84	2,210 Hours

401 PHOTOPRODUCTION #401 — **Michael F. Gormley**

FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN

BEAM: Proton Area - East
PHOTOPRODUCTION OF HIGH MASS TWO-BODY FINAL STATES.
(Using an improved exp #87A apparatus and an additional sweeping magnet in the photon beam.)

Request	22 May, 75	300 Hours
	1 Jun, 78	1,100 Hours
Approval	7 Jul, 75	300 Hours
	2 Jul, 76	300 Hours with a total of 1,000 hours approved for the combination of exps #400, #401, and #458
	14 Mar, 77	600 Hours with a total of 2,000 hours for the combination exps #400,401,8458
	1 Apr, 78	Unspecified since approved running time has been used by exp #87A
	29 Jun, 78	600 Hours
Completed	26 Nov, 79	2,100 Hours

404 INCLUSIVE NEUTRON #404 — **H. Richard Gustafson**

UNIVERSITY OF MICHIGAN
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M2 Beam
INCLUSIVE NEUTRON PRODUCTION BY PROTONS ON PROTONS AND NUCLEI.

Request	22 May, 75	500 Hours
Approval	11 Mar, 76	Parasitic Running with the condition that there will be no significant interference with other work in the Meson Laboratory
Completed	5 Jul, 77	350 Hours

415 PARTICLE PRODUCTION #415 — **Lee G. Pondrom**

BROOKHAVEN NATIONAL LABORATORY
UNIVERSITY OF MICHIGAN
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M2 Beam
MEASUREMENTS OF PI- CU TO K-SHORT, LAMBDA AND NEUTRON INCLUSIVE CROSS SECTIONS.
(For proposal #360 with the apparatus of exp #8 in the M2 beam line.)

Request	24 May, 75	100 Hours
Approval	28 Jun, 75	100 Hours
Completed	18 Oct, 76	100 Hours

416 PARTICLE SEARCH #416 — **Henry J. Lubatti**

UNIV. OF CALIFORNIA, DAVIS
LAL, ORSAY (FRANCE)
UNIVERSITY OF WASHINGTON

BEAM: Meson Area - M1 Beam
STREAMER CHAMBER SEARCH FOR NEW STATES WHICH DECAY SEMI-LEPTONICALLY.
(Using the streamer chamber originally proposed for exp #86A with additional muon counters.)

Request	27 May, 75	300 Hours
Approval	29 May, 75	300 Hours with the understanding that the total running time for exp# 416 and exp# 86A is to remain within 800 hours
Completed	1 Jul, 75	400 Hours

418 PARTICLE PRODUCTION #418 — **Felix Sannes**

IMPERIAL COLLEGE (ENGLAND)
UNIVERSITY OF ROCHESTER
RUTGERS UNIVERSITY

BEAM: Internal Target Area (C-0)
NUCLEAR SIZE DEPENDENCE FOR PARTICLE PRODUCTION AT INTERMEDIATE TRANSVERSE MOMENTUM.
(With the spectrometer used for exp #363.)

Request	2 Jun, 75	Unspecified
Approval	7 Jul, 75	500 Hours contingent upon the fact that such running does not constitute an interference with the requirements of other experiments to be run in that area
Completed	22 Oct, 75	900 Hours

419 EMULSION/PROTONS @ 300 #419 — **Giorgio Giacomelli**

UNIVERSITY OF BOLOGNA (ITALY)

BEAM: Neutrino Area - Miscellaneous
SEARCH FOR SHORT LIVED PARTICLES PRODUCED BY 300 GEV PROTONS IN EMULSIONS.

Request	2 Jun, 75	Emulsion Exposure
Approval	10 Jun, 75	Emulsion Exposure
Completed	10 Jun, 75	1 Stack(s)

421 EMULSION/PROTONS @ 300 #421 — **Venedict P. Dzhelepov**

JINR, DUBNA (RUSSIA)

BEAM: Neutrino Area - Miscellaneous
EXPOSURE OF AN EMULSION CHAMBER TO A 300 GEV/C PROTON BEAM.

Request	18 Jun, 75	Emulsion Exposure
Approval	18 Jun, 75	Emulsion Exposure
Completed	24 Jun, 75	1 Stack(s)

423 EMULSION/PROTONS @ 400 #423 — **Hisahiko Sugimoto**

HIROSAKI UNIVERSITY (JAPAN)
ICRR, UNIVERSITY OF TOKYO (JAPAN)
UNIVERSITY OF TOKYO (JAPAN)
WASEDA UNIVERSITY (JAPAN)

BEAM: Neutrino Area - Miscellaneous
SEARCH FOR NEW PARTICLES IN EMULSION CHAMBERS.

Request	7 Jul, 75	Emulsion Exposure
Approval	21 Jul, 75	Emulsion Exposure
Completed	9 Dec, 75	4 Stack(s)

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424 EMULSION/MUONS @ 200 #424 — **Tomonori Wada**

BEAM: Neutrino Area - Miscellaneous
MULTIPLE PION PRODUCTION BY 200 GEV/C MUONS.

ASHIKAGA INST. OF TECH. (JAPAN)
ICRR, UNIVERSITY OF TOKYO (JAPAN)
OKAYAMA UNIVERSITY (JAPAN)
SAITAMA UNIVERSITY (JAPAN)

Request	23 Jun, 75	Emulsion Exposure
Approval	9 Feb, 76	Emulsion Exposure in the muon beam while it is operating for exp# 319 at a momentum in the vicinity of 300 GeV/c
Completed	8 Oct, 76	1 Stack(s)

425 K ZERO REGENERATION #425 — **Valentine L. Telegdi**

BEAM: Meson Area - M4 Beam
PROPOSAL TO INVESTIGATE REGENERATION OF NEUTRAL K-MESONS AT VERY HIGH ENERGIES.
(Using a liquid hydrogen target; see exp #82.)

UNIV. OF CALIFORNIA, SAN DIEGO
UNIVERSITY OF CHICAGO
LHE, ETH HONGGERBERG (SWITZERLAND)
SLAC
UNIVERSITY OF WISCONSIN-MADISON

Request	24 Jun, 75	600 Hours
Approval	18 Mar, 75	600 Hours contingent upon exp# 425 providing a hydrogen target (see exp# 82)
Completed	17 May, 76	1,400 Hours

426 FRAGMENTATION PARTICLES #426 — **Katsura Fukui**

BEAM: Meson Area - Miscellaneous
PROPOSAL ON THE STUDY OF FRAGMENTATION PARTICLES CREATED IN A PLASTIC DETECTOR BY 300 GEV PROTONS.

HANSCOM A.F.B. GEOPHYSICS LAB.
UNIVERSITY OF KIEL (GERMANY)

Request	27 May, 75	Detector Exposure
Approval	28 Jul, 75	Detector Exposure
Completed	20 Mar, 76	16 Stack(s)

427 DETECTOR DEVELOPMENT #427 — **Luke C. L. Yuan**

BEAM: Meson Area - M1 Beam
A PROPOSAL FOR TESTING A TRANSITION RADIATION DETECTOR AND A HIGH ENERGY SHOWER DETECTOR FOR COSMIC RAY EXPERIMENTS.

BROOKHAVEN NATIONAL LABORATORY

Request	27 Jun, 75	50 Hours
Approval	4 Jan, 78	100 Hours during an opportunity for running in the M1-beam in January 1978
Completed	10 Jan, 78	40 Hours with only a portion of the objectives of the experiment finished due to problems with the M1-beam and the accelerator

428 EMULSION/PROTONS @ 400 #428 — **Jacques D. Hebert**

BEAM: Neutrino Area - Miscellaneous
400 GEV PROTON INTERACTIONS IN NUCLEAR EMULSION.

UNIVERSITY OF BELGRADE(YUGOSLAVIA)
CRN, STRASBOURG (FRANCE)
FERMILAB
UNIVERSITY OF LUND (SWEDEN)
UNIVERSITY OF LYON (FRANCE)
UNIVERSITY OF NANCY (FRANCE)
UNIVERSITY OF OTTAWA (CANADA)
UNIV. OF PARIS VI, LPG (FRANCE)
UNIVERSITY OF QUEBEC (CANADA)
UNIVERSITY OF SANTANDER (SPAIN)
UNIVERSITY OF VALENCIA (SPAIN)
UNIV. OF WESTERN ONTARIO (CANADA)

Request	4 Aug, 75	Emulsion Exposure
Approval	25 Aug, 75	Emulsion Exposure
Completed	9 Dec, 75	14 Stack(s)

434 EMULSION/PROTONS @ 400 #434 — **Shoji Dake**

BEAM: Neutrino Area - Miscellaneous
CASCADE SHOWERS ORIGINATED IN JET SHOWERS.

KOBE UNIVERSITY (JAPAN)
KONAN UNIVERSITY (JAPAN)
SAITAMA UNIVERSITY (JAPAN)
UNIVERSITY OF TOKYO (JAPAN)
UTSUNOMIYA UNIVERSITY (JAPAN)

Request	16 Sep, 75	Emulsion Exposure
Approval	20 Sep, 75	Emulsion Exposure
Completed	9 Dec, 75	3 Stack(s)

435 MUON SEARCH #435 — **Robert K. Adair**

BEAM: Proton Area - Center
MEASUREMENT OF THE POLARIZATION OF PROMPT MUONS AT X = 0.14 AT P-TRANSVERSE = 0 AND P-TRANSVERSE = 1.5 GEV/C.
(Extension of measurements begun in experiment #48.)

BROOKHAVEN NATIONAL LABORATORY
FERMILAB
YALE UNIVERSITY

Request	18 Sep, 75	250 Hours total including 50 hours of tests
Approval	25 Nov, 75	250 Hours of setup and running time
Completed	2 Jul, 76	250 Hours

436 DI-MUON #436 — **Robert K. Adair**

BEAM: Proton Area - Center
DETERMINATION OF THE POSSIBLE DI-MUON CHARACTER OF THE PROMPT MUON FLUX.

BROOKHAVEN NATIONAL LABORATORY
FERMILAB
YALE UNIVERSITY

Request	18 Sep, 75	75 Hours including 40 hours of tests
Approval	7 Oct, 75	100 Hours to be completed during the operating period due to end in Nov. 1975
Completed	29 Oct, 75	200 Hours

438 NEUTRON-NUCLEUS INELASTIC #438 — **Lawrence W. Jones**

BEAM: Meson Area - M3 Beam
INELASTIC CROSS SECTIONS OF NEUTRONS ON NUCLEI.

UNIVERSITY OF MICHIGAN

Request	26 Sep, 75	500 Hours
Approval	25 Nov, 75	200 Hours
Completed	18 Apr, 77	350 Hours

439 MULTI-MUON #439 — **David A. Garelick**

BEAM: Meson Area - M2 Beam
HIGH SENSITIVITY SEARCH FOR NEW STATES WHICH DECAY INTO MUONS.

UNIVERSITY OF MICHIGAN
NORTHEASTERN UNIVERSITY
TUFTS UNIVERSITY
UNIVERSITY OF WASHINGTON

Request	26 Sep, 75	500 Hours with 200 hours for tests and 300 hours for data
	31 May, 77	1,600 Hours to include 3 additional one-month periods of running
Approval	25 Nov, 75	400 Hours
	24 Jun, 77	800 Hours with the understanding that the 400-hour extension and time remaining under previous approval be used for investigation of multi-muon events
	27 Jul, 77	800 Hours with the previous constraints on the further running removed
	24 Mar, 78	1,600 Hours with an extension until the spring 1978 shutdown, but without overriding priority
Completed	19 May, 78	1,700 Hours

440 LAMBDA MAGNETIC MOMENT #440 — **Gerry M. Bunce**

BEAM: Meson Area - M2 Beam
PROPOSAL FOR A NEW MEASUREMENT OF THE MAGNETIC MOMENT OF THE LAMBDA HYPERON.

UNIVERSITY OF MICHIGAN
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

Request	26 Sep, 75	160 Hours
Approval	25 Nov, 75	160 Hours
Completed	22 Mar, 77	250 Hours

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441 LAMBDA POLARIZATION #441 — **Lee G. Pondrom**

UNIVERSITY OF MICHIGAN
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M2 Beam
A PROPOSAL TO STUDY LAMBDA POLARIZATION IN THE INCLUSIVE REACTION PROTON - PROTON TO LAMBDA PLUS ANYTHING WITH LIQUID HYDROGEN TARGET.
(Extension of previous measurements of 300 GeV protons on beryllium to 400 GeV protons on hydrogen.)

Request	29 Sep, 75	150 Hours
Approval	25 Nov, 75	150 Hours
Completed	2 Jul, 77	400 Hours

442 NUCLEAR FRAGMENTS #442 — **Frank Turkot**

FERMILAB
PURDUE UNIVERSITY

BEAM: Internal Target Area (C-0)
STUDY OF NUCLEAR FRAGMENT EMISSION IN PROTON HEAVY NUCLEUS COLLISIONS FROM 10 TO 500 GEV.
(Will use room temperature gas jet target with heavy gases.)

Request	26 Sep, 75	400 Hours for data taking
	11 May, 77	800 Hours to include additional time to search for quarks bound in nuclear fragments
Approval	25 Nov, 75	400 Hours
	25 Jun, 77	400 Hours without time for the quark search
Completed	13 Aug, 77	1,200 Hours

444 DI-MUON #444 — **A. J. Stewart Smith**

UNIVERSITY OF CHICAGO
PRINCETON UNIVERSITY

BEAM: Neutrino Area - Muon/Hadron Beam
A SPECIAL REQUEST FOR HIGH-PRIORITY RUNNING TO MEASURE HIGH-MASS MUON PAIRS.
(Using the Quadrupole Triplet focusing system for producing a high intensity hadron beam.)

Request	25 Sep, 75	400 Hours
	31 May, 77	800 Hours with a request for a 400 hour extension for a scaling test and to increase the sensitivity at high masses
Approval	24 Nov, 75	400 Hours
	24 Jun, 77	400 Hours with a decision not to grant an extension
Completed	3 Jan, 78	1,100 Hours

448 MUON #448 — **William A. Loomis**

UNIVERSITY OF CHICAGO
FERMILAB
HARVARD UNIVERSITY
MASSACHUSETTS INST. OF TECHNOLOGY
MICHIGAN STATE UNIVERSITY
TUFTS UNIVERSITY

BEAM: Neutrino Area - Muon/Hadron Beam
PROPOSAL FOR THE INVESTIGATION OF VIRTUAL PHOTOABSORPTION BY NUCLEAR MATTER.
(Using the cyclotron spectrometer and heavy targets; see proposal #257.)

Request	17 Oct, 75	300 Hours
	9 Jun, 77	300 Hours to study both photoabsorption by nuclear matter and production of charmed particles (the latter to employ a Cerenkov counter)
Approval	15 Mar, 77	Parasitic Running for about 300 hours concurrent with exp #203
	29 Jun, 77	Parasitic Running for about 300 hours for study of photoabsorption of nuclear matter; without the disruption required to install the Cerenkov counter
Completed	7 May, 78	900 Hours

451 INCLUSIVE SCATTERING #451 — **Donald S. Barton**

UNIVERSITY OF BARI (ITALY)
BROWN UNIVERSITY
FERMILAB
MASSACHUSETTS INST. OF TECHNOLOGY
WARSAW HEP LABORATORY (POLAND)

BEAM: Meson Area - M6 Beam
STUDY OF THE A-DEPENDENCE OF INCLUSIVE PROCESSES AND ASSOCIATED MULTIPLICITY.
(Using the single arm spectrometer facility.)

Request	17 Oct, 75	600 Hours including 100 hours of tests
Approval	30 Jun, 76	400 Hours
Completed	6 Sep, 78	500 Hours

456 FORM FACTOR #456 — **Donald H. Stork**

UNIV. OF CALIFORNIA, LOS ANGELES
FERMILAB
JINR, DUBNA (RUSSIA)
NOTRE DAME UNIVERSITY
UNIVERSITY OF PITTSBURGH

BEAM: Meson Area - M1 Beam
MEASUREMENT OF THE KAON FORM FACTOR.
(Continuation of work begun in exp #216.)

Request	17 Oct, 75	800 Hours including 200 hours of tests
Approval	25 Nov, 75	500 Hours
	7 Dec, 76	950 Hours including an additional 450 hours for data taking with a request for a report on preliminary results from existing data before the start of the next running period
Completed	13 Apr, 77	1,450 Hours

458 PHOTOPRODUCTION #458 — **Wonyong Lee**

COLUMBIA UNIVERSITY
FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN

BEAM: Proton Area - East
PHOTOPRODUCTION EXPERIMENT AT FERMILAB.
(Using the broad band photon beam; a continuation of work begun in exp #87A and #401.)

Request	17 Oct, 75	700 Hours
	7 May, 76	900 Hours with 300 hours for testing, 600 hours for data
Approval	2 Jul, 76	300 Hours with a total of 1,000 hours approved for the comination of exps #400, #401, and #458
	14 Mar, 77	1,000 Hours with a total of 2,000 hours for the combination of expts #400,401,&458
	1 Apr, 78	Unspecified since approved running time has been used by exp #87a
Approved/Inactive	27 Oct, 81	Unspecified

461 EMULSION/PROTONS @ 400 #461 — **Jere J. Lord**

UNIV. OF AUCKLAND (NEW ZEALAND)
AUSTRALIAN NAT'L. UNIV.(AUSTRALIA)
UNIVERSITY OF MELBOURNE(AUSTRALIA)
UNIVERSITY OF SYDNEY (AUSTRALIA)
UNIVERSITY OF TASMANIA (AUSTRALIA)
UNIVERSITY OF WASHINGTON

BEAM: Neutrino Area - Miscellaneous
SEARCH FOR NEW PARTICLES FROM 400 GEV PROTON COLLISIONS IN EMULSIONS.

Request	10 Nov, 75	Emulsion Exposure
Approval	26 Nov, 75	6 Stack(s)
Completed	9 Dec, 75	6 Stack(s)

462 EMULSION/PROTONS @ 400 #462 — **Giorgio Giacomelli**

UNIVERSITY OF BOLOGNA (ITALY)
UNIVERSITY OF FIRENZE (ITALY)

BEAM: Neutrino Area - Miscellaneous
SEARCH FOR SHORT LIVED PARTICLES PRODUCED BY 400 GEV PROTONS IN EMULSIONS.

Request	18 Nov, 75	Emulsion Exposure
Approval	26 Nov, 75	Emulsion Exposure
Completed	9 Dec, 75	1 Stack(s)

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463 EMULSION/PROTONS @ 400 #463 — **M. I. Tretjakova**

KAZAKH STATE UNIV., (KAZAKHSTAN)
LEBEDEV PHYSICAL INST. (RUSSIA)
ITEP, MOSCOW (RUSSIA)
NPI, ST. PETERSBURG (RUSSIA)
TASHKENT, PHY.TEC.INS (UZBEKISTAN)

BEAM: Neutrino Area - Miscellaneous
THE INTERACTIONS OF PROTONS IN NUCLEAR EMULSION AT 400 GEV/C (OR 500 GEV/C).

Request	17 Nov, 75	Emulsion Exposure
Approval	26 Nov, 75	Emulsion Exposure
Completed	9 Dec, 75	2 Stack(s)

466 NUCLEAR FRAGMENTS #466 — **Norbert T. Porile**

ARGONNE NATIONAL LABORATORY
UNIVERSITY OF CHICAGO
UNIV. OF ILLINOIS, CHICAGO CIRCLE
PURDUE UNIVERSITY

BEAM: Proton Area - Miscellaneous
A PROPOSAL FOR THE STUDY OF HIGH-ENERGY REACTION MECHANISMS BY THE MEASUREMENT OF THE ANGULAR AND ENERGY DISTRIBUTIONS OF NUCLEAR FRAGMENTS RECOILING FROM TARGETS BOMBARDED WITH 200-300 GEV PROTONS.

Request	9 Jan, 76	500 Hours
Approval	30 Mar, 76	500 Hours to be met on an essentially parasitic basis with the understanding that this work will not constitute an interference with the rest of the proton area program
Completed	15 Feb, 88	102 Targets Exposed

467 TEST MUON IRRADIATION #467 — **Melvin Freedman**

ARGONNE NATIONAL LABORATORY

BEAM: Neutrino Area - Miscellaneous
PROPOSAL FOR PARASITIC DUAL TARGET IRRADIATION WITH MUON SPILL BEAM BEHIND EXP #319.

Request	13 Jan, 76	Target Exposure(s)
Approval	28 Apr, 76	Parasitic Running for a bombardment of chlorine and thallium targets downstream of exp #319 or exp #398
Completed	1 Dec, 76	4 Targets Exposed

468 PARTICLE SEARCH #468 — **Phillip H. Steinberg**

UNIVERSITY OF MARYLAND

BEAM: Meson Area - M2 Beam
SEARCH FOR PENETRATING MASSIVE NEUTRAL PARTICLES PRODUCED IN HIGH ENERGY PROTON COLLISIONS.

Request	21 Jan, 76	1,200 Hours
	4 Oct, 76	300 Hours in a 400 GeV proton beam at an intensity of 10 to the 9th protons/pulse
	4 Nov, 77	450 Hours including an additional 150 hours to improve the sensitivity during another run of the experiment
Approval	18 Nov, 76	300 Hours
Completed	14 Aug, 77	300 Hours

469 PARTICLE SEARCH #469 — **David Cutts**

UNIVERSITY OF BARI (ITALY)
BROWN UNIVERSITY
CERN (SWITZERLAND)
FERMILAB
MASSACHUSETTS INST. OF TECHNOLOGY

BEAM: Meson Area - M6 Beam
SEARCH FOR HEAVY LONG-LIVED PARTICLES.
(Using the single arm spectrometer facility.)

Request	23 Jan, 76	150 Hours
Approval	3 Feb, 78	150 Hours with the understanding that the schedule for this run may place the desired running for exp #451 in some jeopardy
Completed	15 May, 78	400 Hours

472 PARTICLE SEARCH #472 — **Kenneth C. Stanfield**

FERMILAB
UNIVERSITY OF MICHIGAN
PURDUE UNIVERSITY

BEAM: Meson Area - M2 Beam
SEARCH FOR HEAVY PARTICLES PRODUCED IN ASSOCIATION WITH PROMPT MUONS.
(Experiment would use modified exp #357 spectrometer.)

Request	23 Jan, 76	600 Hours including 100 hours of tests
Approval	10 Mar, 76	600 Hours
Completed	29 Nov, 76	1,100 Hours

481 EMULSION/PI- @ 300 #481 — **Yoshiyuki Takahashi**

OSAKA CITY UNIVERSITY (JAPAN)
SHINSHU UNIVERSITY (JAPAN)

BEAM: Neutrino Area - Miscellaneous
INVESTIGATION OF MULTIPLE PRODUCTION BY PI - MESONS WITH EMULSION CHAMBER.

Request	28 Apr, 76	Emulsion Exposure 10K particles per cm. sq. over a square of 10 cm x 10 cm
Approval	12 May, 76	Emulsion Exposure
Completed	18 Jan, 78	7 Stack(s)

482 NEUTRINO #482 — **Barry C. Barish**

CALIFORNIA INSTITUTE OF TECHNOLOGY
FERMILAB
NORTHWESTERN UNIVERSITY
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY

BEAM: Neutrino Area - Quadrupole Triplet
STUDY OF DI-MUON EVENTS PRODUCED IN NEUTRINO INTERACTIONS.

Request	11 May, 76	500 Hours to be run with the Quadrupole Triplet train load with focus set at 200 GeV at 10 to the 13th protons per pulse
Approval	30 Jun, 76	Parasitic Running with other experiments using the neutrino beam
Completed	3 Jan, 78	1,600 Hours

486 K ZERO CROSS SECTION #486 — **Bruce D. Winstein**

UNIVERSITY OF CHICAGO
LHE, ETH HONGGERBERG (SWITZERLAND)
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M4 Beam
PROPOSAL TO STUDY THE ATOMIC NUMBER DEPENDENCE OF THE DIFFERENCE BETWEEN PARTICLE AND ANTI-PARTICLE TOTAL CROSS SECTIONS.
(Using the apparatus of exps #82 and #425 with modifications.)

Request	7 May, 76	200 Hours to be run in a modified version of the M-4 neutral beam; data taking to require 1.4 x 10 to the 17th protons into the meson production target
Approval	30 Jun, 76	200 Hours with a total of 800 hours approved for the combination of E-486 and E-226
Completed	17 Mar, 77	950 Hours

490 PARTICLE SEARCH #490 — **Jack Sandweiss**

FERMILAB
LAWRENCE BERKELEY LABORATORY
YALE UNIVERSITY

BEAM: Meson Area - M1 Beam
SEARCH FOR SHORT LIVED PARTICLES USING A HIGH RESOLUTION STREAMER CHAMBER.

Request	7 May, 76	800 Hours to be run in a 200 GeV pi- beam of intensity 8 x 10 to the 5th particles per pulse focused to a 1 mm x 5 mm spot
Approval	30 Jun, 76	Test Running to study the performance of the high resolution streamer chamber
Completed	9 Jun, 80	850 Hours

494 DI-HADRON #494 — **Myron L. Good**

COLUMBIA UNIVERSITY
FERMILAB
SUNY AT STONY BROOK

BEAM: Proton Area - Center
A STUDY OF DI-HADRON PRODUCTION IN PROTON COLLISIONS AT FERMILAB.
(This experiment is an off-shoot of di-lepton #288.)

Request	10 May, 76	800 Hours
Approval	17 May, 76	800 Hours
	17 Nov, 76	1,400 Hours including an additional six weeks of running with the experiment expected to terminate in February 1977
Completed	21 Feb, 77	1,950 Hours

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495 XI-ZERO PRODUCTION #495 — **Kenneth J. Heller**

BROOKHAVEN NATIONAL LABORATORY
UNIVERSITY OF MICHIGAN
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M2 Beam
PROPOSAL TO STUDY CASCADE ZERO AND ANTILAMBDA PRODUCTION AND POLARIZATION.
(Experiment would use the spectrometer of E-8.)

Request	17 May, 76	400 Hours	
Approval	17 Nov, 76	400 Hours	
Completed	28 Aug, 78	700 Hours	

497 CHARGED HYPERON #497 — **Joseph Lach**

FERMILAB
IOWA STATE UNIVERSITY
YALE UNIVERSITY

BEAM: Proton Area - Center
ELASTIC SCATTERING OF THE HYPERONS.
(Measurements of charged hyperon fluxes and differential elastic cross sections, and a particle search.)

Request	13 May, 76	1,200 Hours	with 600 hours for flux measurements and new particle search and 600 hours to measure differential cross sections
	26 Jan, 79	800 Hours	including an additional 400 hours to search for the b-particle after the beam is commissioned
Approval	29 Jun, 76	400 Hours	initial approval
Completed	16 Mar, 81	2,500 Hours	see proposal #697

498 DETECTOR DEVELOPMENT #498 — **Charles R. Gruhn**

LOS ALAMOS NATIONAL LABORATORY

BEAM: Proton Area - East
A MEASUREMENT OF THE RELATIVISTIC RISE IN THE MOST PROBABLE ENERGY LOSS IN THIN SOLID FILMS.

Request	26 May, 76	50 Hours in an electron beam at the highest energies available
Approval	14 Jun, 76	Parasitic Running that will not disturb the normal proton area program
Completed	18 Aug, 76	50 Hours

499 EMULSION/PROTONS @ 400 #499 — **Junsuke Iwai**

WASEDA UNIVERSITY (JAPAN)

BEAM: Neutrino Area - Miscellaneous
A STUDY OF ANGULAR DISTRIBUTIONS IN PROTON-NUCLEUS COLLISIONS USING NUCLEAR EMULSIONS.

Request	1 Jun, 76	2 Exposure(s)
Approval	16 Aug, 76	Emulsion Exposure with one stack exposed to an intensity of 600K protons/sq cm and a second to an intensity of 10K protons/sq cm
Completed	15 Jan, 78	5 Stack(s)

501 TEST MUON IRRADIATION #501 — **Kenneth Lande**

BROOKHAVEN NATIONAL LABORATORY
UNIVERSITY OF PENNSYLVANIA

BEAM: Neutrino Area - Muon/Hadron Beam
PROPOSAL FOR A MEASUREMENT OF THE TRANSITION RATE FOR CL(37) AND AR(37) INDUCED BY MUONS AT FERMILAB ENERGIES.

Request	11 Aug, 76	25 Hours an integrated flux of - about 5 x 10 to the 9th times (e/300) to the 0.7th - muons @ 75, 150, and 250 GeV
Approval	28 Oct, 76	Target Exposure(s) parasitic to running of upstream muon experiments
Completed	1 Dec, 76	2 Targets Exposed

502 MONOPOLE #502 — **David F. Bartlett**

UNIVERSITY OF COLORADO AT BOULDER
GENERAL ELECTRIC R&D CENTER

BEAM: Neutrino Area - Miscellaneous
SEARCH FOR MONOPOLES ABOVE THE 15-FOOT BUBBLE CHAMBER.
(Would require a scuttle in the roof of the 15-foot bubble chamber building.)

Request	30 Jul, 76	Cosmic Ray Running to include use of the fringe field of the 15-foot bubble chamber magnet during two long runs; approximately 7 months of data-taking requested with lexan and later with emulsion detectors
Approval	2 Sep, 76	Cosmic Ray Running during parasitic operation in the fringe field of the 15-foot bubble chamber magnet
Completed	23 Jun, 80	Cosmic Ray Running

503 EMULSION/PI- @ 300 #503 — **Takeshi Ogata**

HIROSAKI UNIVERSITY (JAPAN)
ICRR, UNIVERSITY OF TOKYO (JAPAN)
KONAN UNIVERSITY (JAPAN)
KWANSEI GAKUIN UNIVERSITY (JAPAN)

BEAM: Neutrino Area - Miscellaneous
MULTIPARTICLE PRODUCTION IN HIGH ENERGY PION-NUCLEUS INTERACTIONS.

Request	12 Aug, 76	Emulsion Exposure consisting of eight blocks of mulsion exposed to 50K particles/sq cm in a pi- beam of 200 GeV/c or greater
Approval	19 Aug, 76	Emulsion Exposure
Completed	18 Jan, 78	4 Stack(s)

505 PROTON POLARIZATION #505 — **Samuel Peter Yamin**

BROOKHAVEN NATIONAL LABORATORY
UNIVERSITY OF MICHIGAN
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M2 Beam
A SEARCH FOR PROTON POLARIZATION IN INCLUSIVE PRODUCTION AT 300 GEV/C.

Request	16 Aug, 76	100 Hours	with a change in the targetting angle of the primary proton beam for the meson area
Approval	29 Jun, 78	100 Hours	with low priority during the time available for exp #495
Completed	27 Aug, 78	50 Hours	

506 EMULSION/PI- @ 300 #506 — **Shoji Dake**

KOBE UNIVERSITY (JAPAN)
KONAN UNIVERSITY (JAPAN)
SAITAMA UNIVERSITY (JAPAN)
UNIVERSITY OF TOKYO (JAPAN)

BEAM: Neutrino Area - Miscellaneous
CASCADE SHOWERS ORIGINATED IN JET SHOWERS DUE TO NEGATIVE PIONS.

Request	17 Aug, 76	Emulsion Exposure using two - three emulsion chambers 10 cm x 10 cm x 8 xm exposed to 10-100 particles/sq cm in a pi- beam of 200 GeV/c or greater
Approval	23 Aug, 76	Emulsion Exposure
Completed	15 Jan, 78	2 Stack(s)

507 HIGH ENERGY CHANNELING #507 — **Edouard N. Tsyganov**

UNIV. OF CALIFORNIA, LOS ANGELES
FERMILAB
JINR, DUBNA (RUSSIA)
KHARKOV PHYS-TECH INST (UKRAINE)
LEHIGH UNIVERSITY
ITEP, MOSCOW (RUSSIA)
SUNY AT ALBANY
TOMSK POLYTECH. INST. (USSR)
INR, WARSAW (POLAND)

BEAM: Meson Area - M1 Beam
PROPOSAL TO STUDY CHANNELING AT FERMILAB.
(Using the spectrometer of exp #456.)

Request	8 Sep, 76	250 Hours	use of the M-1 beam is requested in conjunction with operation of form factor #456
Approval	1 Jun, 77	250 Hours	with the understanding that this activity will not delay significantly the program in the M1 beam
Completed	30 May, 77	350 Hours	

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508 EMULSION/PROTONS @ 500 #508 — **Wladyslaw Wolter** — INP, KRAKOW (POLAND)
BEAM: Meson Area - Test Beam
STUDY OF THE MECHANISM FOR MULTIPLE PRODUCTION OF PARTICLES AT HIGH ENERGIES.

Request	15 Sep, 76	Emulsion Exposure consisting of 3 emulsion stacks
Approval	24 Sep, 76	Emulsion Exposure
Completed	26 Apr, 85	7 Emulsion Stack(s)

509 EMULSION/MUONS @ 200 #509 — **T. Shirai** — KANAGAWA UNIVERSITY (JAPAN); KOBE UNIVERSITY (JAPAN); UNIVERSITY OF TOKYO (JAPAN)
BEAM: Neutrino Area - Miscellaneous
SEARCH FOR THE LARGE ANGLE SCATTERING OF MUONS.

Request	13 Sep, 76	Emulsion Exposure of 10 to the 6th particles/sq cm
Approval	24 Sep, 76	Emul ion Exposure
Completed	8 Oct, 76	1 Stack(s)

510 EMULSION/ELECTRONS @ HI E #510 — **Kiyoshi Niu** — AICHI UNIV. OF EDUCATION (JAPAN); NAGOYA UNIVERSITY (JAPAN); YOKOHAMA NATIONAL UNIV. (JAPAN)
BEAM: Proton Area - Miscellaneous
STUDY OF CASCADE SHOWERS INITIATED BY ELECTRONS.

Request	9 Sep, 76	Emulsion Exposure
Approval	24 Sep, 76	Emulsion Exposure
Completed	5 Oct, 76	6 Stack(s)

515 PARTICLE SEARCH #515 — **Jerome L. Rosen** — CARNEGIE-MELLON UNIVERSITY; FERMILAB; NORTHWESTERN UNIVERSITY; NOTRE DAME UNIVERSITY
BEAM: Meson Area - M1 Beam
PROPOSAL TO STUDY CHARGED PARTICLES PRODUCED IN HADRONIC INTERACTIONS.

Request	5 Oct, 76	1,000 Hours in a high intensity pi- beam @ 200 GeV/c
Approval	14 Mar, 77	800 Hours
Completed	10 Mar, 82	2,650 Hours

516 PHOTOPRODUCTION #516 — **E. Thomas Nash** — UNIV. OF CALIFORNIA, SANTA BARBARA; CARELTON UNIVERSITY (CANADA); UNIVERSITY OF COLORADO AT BOULDER; FERMILAB; NATIONAL RESEARCH COUNCIL (CANADA); UNIVERSITY OF OKLAHOMA; UNIVERSITY OF TORONTO (CANADA)
BEAM: Proton Area - East
A STUDY OF PHOTOPRODUCTION USING A MAGNETIC SPECTROMETER AT THE TAGGED PHOTON LAB.

Request	5 Oct. 76	1,000 Hours in the tagged photon beam assuming a primary beam of 450 GeV protons with 2.9 x 10 to the 15th protons/hour
	3 Oct, 77	1,000 Hours with 6 x 10 to the 12th protons per pulse, a 1 sec. flattop and a 10 sec. cycle
Approval	15 Nov, 77	1,000 Hours to include 400 hours for testing and 600 hours for data
Completed	1 Jun, 81	4,500 Hours

522 PROTON POLARIZATION #522 — **Harold O. Ogren** — INDIANA UNIVERSITY
BEAM: Internal Target Area (C-0)
A STUDY OF INCLUSIVE PROTON POLARIZATION.

Request	28 Oct, 76	840 Hours the experiment would run with the existing exp #313 set-up in the internal target area
Approval	25 Jun, 77	800 Hours conditional on cryogenic operation of the internal target area
Completed	21 Mar, 78	700 Hours

524 EMULSION/PROTONS > 500 GEV #524 — **Richard J. Wilkes** — UNIVERSITY OF WASHINGTON
BEAM: Meson Area - Test Beam
PROPOSAL TO STUDY INTERACTIONS OF PROTONS OF ENERGY GREATER THAN 500 GEV IN EMULSION AND HEAVY NUCLEI.

Request	18 Jan, 77	Emulsion Exposure of 10 plates would be exposed to fluxes ranging from 75,000 to 200,000 particles/sq.cm.
Approval	3 Mar, 77	Emulsion Exposure with a momentum of approximately 500 GeV/c
Completed	26 Apr, 85	6 Emulsion Stack(s)

525 EMULSION/PI- @ 300 #525 — **Richard J. Wilkes** — UNIVERSITY OF WASHINGTON
BEAM: Neutrino Area - Miscellaneous
PROPOSAL TO STUDY PROTON-NUCLEUS INTERACTIONS IN EMULSION PLATES WITH EMBEDDED METAL POWDER GRANULES AT 300 GEV.

Request	18 Jan, 77	Emulsion Exposure of 10 plates would be exposed in a negative beam to fluxes ranging from 75,000 - 200,000 particles/sq.cm.
	13 Dec, 77	Emulsion Exposure with a request for the beam energy to be changed to 300 GeV
Approval	3 Mar, 77	Emulsion Exposure
Completed	15 Jan, 78	2 Stack(s)

531 NEUTRINO #531 — **Neville W. Reay** — AICHI UNIV. OF EDUCATION (JAPAN); FERMILAB; ICRR, UNIVERSITY OF TOKYO (JAPAN); KOBE UNIVERSITY (JAPAN); KOREA UNIVERSITY, SEOUL (KOREA); MCGILL UNIVERSITY (CANADA); NAGOYA UNIVERSITY (JAPAN); OHIO STATE UNIVERSITY; OKAYAMA UNIVERSITY (JAPAN); OSAKA CITY UNIVERSITY (JAPAN); OSAKA SCIENCE EDUC. INST. (JAPAN); UNIVERSITY OF OTTAWA (CANADA); UNIVERSITY OF TORONTO (CANADA); VIRGINIA POLYTECHNIC INSTITUTE; YOKOHAMA NATIONAL UNIV. (JAPAN)
BEAM: Neutrino Area - Wide Band Horn
A PROPOSAL TO STUDY WEAK DECAY LIFETIMES OF NEUTRINO PRODUCED PARTICLES IN A TAGGED EMULSION SPECTROMETER.

Request	31 Jan, 77	1,500 Hours or a total proton flux of 3 x 10 to the 18th
	19 May, 78	3,000 Hours including a second parasitic run
	8 May, 79	2,250 Hours total with an additional 1,100 hours requested for two runs of 6 x 10 to the 18th protons each, the first to be neutrinos (350 GeV pi+), the second to be antineutrinos (350 GeV pi- with the plug out)
Approval	15 Mar, 77	Parasitic Running concurrent with other neutrino experiments
	1 Jul, 79	Parasitic Running concurrent with the next 15-foot bubble chamber neutrino run with the Wide Band Horn
Completed	1 Jun, 81	3,800 Hours

533 PI-MU ATOMS #533 — **Gordon B. Thomson** — UNIVERSITY OF CHICAGO; STANFORD UNIVERSITY; UNIVERSITY OF WISCONSIN-MADISON
BEAM: Meson Area - M3 Beam
PROPOSAL TO MEASURE THE RATE OF FORMATION OF PI-MU ATOMS IN K-LONG M 3 DECAY.

Request	1 Feb, 77	500 Hours based on 3 x 10 to the 6th K-longs/pulse in the M3 beam
Approval	18 Mar, 77	500 Hours with the requirement that preliminary studies and tests show that costs for the experiment are reasonable
	19 Mar, 79	2,100 Hours for the additional 1,500 hours requested for tuneup and data to complete the experiment
Completed	28 Nov, 79	2,050 Hours

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536 EMULSION/NEUTRINO #536 — **Kiyoshi Niu**

AICHI UNIV. OF EDUCATION (JAPAN)
NAGOYA UNIVERSITY (JAPAN)
YOKOHAMA NATIONAL UNIV. (JAPAN)

BEAM: Neutrino Area - Wide Band Horn
STUDY OF NEUTRINO INTERACTIONS IN NUCLEAR EMULSIONS.

Request	2 Feb, 77	500 Hours	or 1 x 10 to the 18th protons to be run in the broad band neutrino beam on a parasitic basis with the regular neutrino program
Approval	10 Feb, 77	Parasitic Running	
Completed	13 Aug, 77	2 Stack(s)	

537 DI-MUON #537 — **Bradley B. Cox**

UNIVERSITY OF ATHENS (GREECE)
FERMILAB
MCGILL UNIVERSITY (CANADA)
UNIVERSITY OF MICHIGAN
SHANDONG UNIVERSITY (PRC)

BEAM: Proton Area - West
PROPOSAL TO STUDY PBAR-N INTERACTIONS IN THE P-WEST HIGH INTENSITY LABORATORY

Request	14 Feb, 77	1,700 Hours	with 300 hours of tuning and 600 hours initial data run to be followed by 800 hours for final data run, all in high intensity secondary beam
	31 Oct, 77	1,400 Hours	to include 100 hours of tuneup, 300 hours of pi- @ 200 or 300 GeV, 700 hours of pi+ @ 200 or 300 GeV and 300 hours of pbar @ 100 GeV
	31 Jan, 78	2,000 Hours	in high intensity secondary beam. Phase 1 would consist of 250 hours for tune up and 750 hours for data taking on di-muon production by p bars. Phase 2 would consist of 250 hours for tune up and 750 hours for data taking on di-electron production by p bars
Approval	16 Mar, 78	1,000 Hours	for study of di-muon production by pbars
Completed	28 Feb, 82	2,700 Hours	

540 PARTICLE SEARCH #540 — **Michael J. Longo**

UNIVERSITY OF MICHIGAN

BEAM: Meson Area - M3 Beam
A SEARCH FOR NEW METASTABLE PARTICLES TRAPPED IN MATTER.

Request	22 Mar, 77	1,900 Hours	with a running period of six months in the M3 beam. The beam would be used 50 - 75% of the time available.
Approval	23 May, 77	Parasitic Running	conditional on negotiation of an agreement and that the experiment will be mounted and run under low priority conditions
Completed	21 Feb, 78	600 Hours	

545 15-FOOT NEUTRINO/D2&HIZ #545 — **George A. Snow**

ILLINOIS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF MARYLAND
SUNY AT STONY BROOK
TOHOKU UNIVERSITY (JAPAN)
TUFTS UNIVERSITY

BEAM: Neutrino Area - Wide Band Horn
PROPOSAL FOR AN EXTENSION OF E-151/E-227 TO STUDY NEUTRINO INTERACTIONS IN DEUTERIUM IN THE 15-FOOT BUBBLE CHAMBER WITH PLATES.
(An initial run will be without plates.)

Request	18 Apr, 77	300 K Pix	
	21 Dec, 77	500 K Pix	to be run in the wide band beam with 1.3 x 10 to the 13th protons per pulse incident on the target at 400 GeV
Approval	16 Mar, 78	350 K Pix	or equivalently 3.5 x 10 to the 18th protons; with the assumption that the test of the plate system will be successful
	28 Jun, 78	350 K Pix	to be run in the 15-ft chamber without plates
Completed	17 Jan, 79	317 K Pix	

546 15-FOOT NEUTRINO/H2&NE #546 — **Fred Russ Huson**

UNIV. OF CALIFORNIA, BERKELEY
FERMILAB
UNIVERSITY OF HAWAII AT MANOA
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF WASHINGTON
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Neutrino Area - Quadrupole Triplet
HIGH ENERGY NEUTRINO AND ANTINEUTRINO INTERACTIONS IN THE 15-FOOT BUBBLE CHAMBER USING THE QUADRUPOLE TRIPLET TRAIN LOAD AND THE TWO-PLANE EMI.

Request	27 Apr, 77	250 K Pix	with specific interest in an exposure of 5 x 10 to the 18th protons
Approval	29 Jun, 77	Parasitic Running	concurrent with other neutrino running with the Quad Triplet train
Completed	26 Jan, 78	375 K Pix	

547 EMULSION/PROTONS @ 400 #547 — **C. J. Jacquot**

CRN, STRASBOURG (FRANCE)
UNIVERSITY OF LYON (FRANCE)
UNIVERSITY OF SANTANDER (SPAIN)

BEAM: Neutrino Area - Miscellaneous
ANGULAR CORRELATIONS STUDY IN PROTON-NUCLEI JETS AT 400-500 GEV USING EMULSION TELESCOPE TECHNIQUES.

Request	27 Apr, 77	Emulsion Exposure	in a 400-500 GeV proton beam with incoming flux of 5 x 10 to the 4th particles over a surface 5 x 5 cm sq.
Approval	14 Jun, 77	Emulsion Exposure	
Completed	15 Jan, 78	24 Stack(s)	

549 QUARK #549 — **Michael J. Longo**

UNIVERSITY OF MICHIGAN
STANFORD UNIVERSITY

BEAM: Neutrino Area - Miscellaneous
A SEARCH FOR FRACTIONAL CHARGES USING ACCELERATOR AND LOW TEMPERATURE TECHNIQUES.

Request	2 May, 77	Parasitic Running	to expose at least 12 niobium spheres in the vicinity of a proton beam with intensities of > 1 x 10 to the 13th per pulse
Approval	16 May, 77	Parasitic Running	contingent on the target being prepared and provided by the experimenters
Approved/Inactive	1 Oct, 78	1 Target Exposure(s) as of 1 Oct 1978	

552 P-N SCATTERING #552 — **Felix Sannes**

IMPERIAL COLLEGE (ENGLAND)
UNIVERSITY OF ROCHESTER
RUTGERS UNIVERSITY

BEAM: Internal Target Area (C-0)
A PROPOSAL TO STUDY P - P ELASTIC AND P - D COHERENT SCATTERING.

Request	6 May, 77	900 Hours	
Approval	25 Jun, 77	800 Hours	conditional on cryogenic operation of the Internal Target Area
Completed	9 Apr, 78	950 Hours	

553 NEUTRINO #553 — **Paul F. Shepard**

CORNELL UNIVERSITY
UNIVERSITY OF LIBRE (BELGIUM)
UNIVERSITY OF LUND (SWEDEN)
UNIVERSITY OF OKLAHOMA
UNIVERSITY OF PADOVA (ITALY)
UNIVERSITY OF PITTSBURGH
INFN, ROME (ITALY)
UNIVERSITY OF SYDNEY (AUSTRALIA)
UNIVERSITY OF TORINO (ITALY)
YORK UNIVERSITY (CANADA)

BEAM: Neutrino Area - Wide Band Horn
A PROPOSAL TO SEARCH FOR SHORT-LIVED PARTICLES PRODUCED BY ANTINEUTRINOS AND NEUTRINOS
(Using a hybrid emulsion-visual detecter.)

Request	6 May, 77	2,000 Hours	with a specific request for 4 x 10 to the 18th protons
	5 Mar, 79	2,500 Hours	total with an additional 1,000 hours for a run of at least 7 x 10 to the 18th protons with the broad band beam tuned for neutrinos
Approval	24 Jun, 77	Parasitic Running	conditional on review of detector tests
	16 Nov, 77	Parasitic Running	conditional on review of detector tests in January 1978
	1 Jul, 79	Parasitic Running	concurrent with the next 15-foot bubble chamber neutrino run with the Wide Band Horn
Completed	1 Apr, 80	1,500 Hours	

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555 NEUTRAL HYPERON #555 — **Thomas J. Devlin**

BEAM: Meson Area - M2 Beam
A PROPOSAL TO STUDY CROSS SECTIONS AND POLARIZATION IN NEUTRAL STRANGE PARTICLE PRODUCTION AT HIGH TRANSVERSE MOMENTUM.
(Using the neutral hyperon beam and associated experimental apparatus.)

UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

Request	6 May, 77	250 Hours for tuneup and data
	19 May, 78	530 Hours for tuning and data at intensities of 1 x 10 to the 11th per pulse
Approval	15 Nov, 78	450 Hours
Completed	17 Feb, 82	650 Hours

557 HADRON JETS #557 — **Ernest I. Malamud**

BEAM: Meson Area - Test Beam
PROPOSAL TO STUDY HADRON JETS WITH THE CALORIMETER TRIGGERED MULTIPARTICLE SPECTROMETER.
(Continuation of work begun in exp #260.)

UNIVERSITY OF ARIZONA
CALIFORNIA INSTITUTE OF TECHNOLOGY
FERMILAB
FLORIDA STATE UNIVERSITY
GEORGE MASON UNIVERSITY
UNIV. OF ILLINOIS, CHICAGO CIRCLE
INDIANA UNIVERSITY
UNIVERSITY OF MARYLAND
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
RUTGERS UNIVERSITY

Request	9 May, 77	1,600 Hours for data with a suggested run plan as follows - 400 hours at 200 GeV, 800 hours with upgraded M6-beam at 300 GeV, and 400 hours at 400 GeV
Approval	24 Jun, 77	1,600 Hours conditional on a better understanding of beam requirements for the experiment after an upgrading of the M6 beam
Completed	14 Jul, 84	1,470 Hours

564 15-FOOT & EMULSION/NEUTRINO#564 — **Louis Voyvodic**

BEAM: Neutrino Area - Wide Band Horn
DIRECT DETECTION OF SHORT-LIVED PARTICLES FROM NEUTRINO INTERACTIONS IN NUCLEAR EMULSIONS INSIDE THE 15-FOOT BUBBLE CHAMBER.

FERMILAB
ILLINOIS INSTITUTE OF TECHNOLOGY
JINR, DUBNA (RUSSIA)
UNIVERSITY OF KANSAS
INP, KRAKOW (POLAND)
ITEP, MOSCOW (RUSSIA)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
INST.FOR NUCL. RESEARCH (BULGARIA)
UNIVERSITY OF SYDNEY (AUSTRALIA)
UNIVERSITY OF WASHINGTON

Request	11 May, 77	1,500 Hours with a specific request for neutrinos from a total proton flux of 3 x 10 to the 18th; running is proposed during the 15-foot running period with a deuterium fill planned for the spring of 1978
	8 May, 79	1,100 Hours additional to be run parasitically in the 15-ft chamber. film from two auxiliary cameras is requested for the neutrino portion of the running
Approval	24 Jun, 77	Parasitic Running with the understanding that the experiment impose only a small impact on the 15-ft chamber operations
	1 Jul, 79	Parasitic Running with the understanding that the experiment impose only a small impact on the 15-ft chamber operations
Completed	9 Mar, 81	277 K Pix

565 30-INCH HYBRID #565 — **Irwin A. Pless**

BEAM: Neutrino Area - 30 in. Hadron Beam
A STUDY OF THE DETAILED CHARACTERISTICS OF HADRON-NUCLEUS COLLISIONS USING THE FERMILAB HYBRID SPECTROMETER.
(The experiment would be run with aluminum, silver, and gold foil targets mounted inside the 30-inch hydrogen-filled bubble chamber.)

BROWN UNIVERSITY
FERMILAB
COLLEGE DE FRANCE (FRANCE)
INDIANA UNIVERSITY
MASSACHUSETTS INST. OF TECHNOLOGY
NIJMEGEN UNIVERSITY (NETHERLANDS)
OAK RIDGE NATIONAL LABORATORY
RUTGERS UNIVERSITY
STEVENS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF TEL-AVIV (ISRAEL)
UNIVERSITY OF TENNESSEE, KNOXVILLE
TOHOKU GAKUIN UNIVERSITY (JAPAN)
TOHOKU UNIVERSITY (JAPAN)
YALE UNIVERSITY

Request	2 Jun, 77	3,000 K Pix in a 400 GeV proton beam (400 hours, 1,000K pix) and a 200 GeV proton plus pion beam (800 hours, 2,000K pix)
	7 Feb, 78	2,000 K Pix to be taken as follows- 500K pix with 200 GeV incident protons 500K pix with 200 GeV incident pi+ 800K pix with 200 GeV incident pi- 200K pix with 400 GeV incident protons
Approval	16 Mar, 78	Parasitic Running with exp #570
Completed	1 Jun, 82	1,068 K Pix total for E-565 and E-570

567 PARTICLE SEARCH #567 — **Michael S. Witherell**

BEAM: Proton Area - West
SEARCH FOR CHARM PRODUCTION IN 200 GEV/C HADRON INTERACTIONS.
(Using the spectrometer for exp #302 with additions.)

BROOKHAVEN NATIONAL LABORATORY
CEN-SACLAY (FRANCE)
FERMILAB
PRINCETON UNIVERSITY
UNIVERSITY OF TORINO (ITALY)

Request	13 Jun, 77	500 Hours
Approval	24 Jun, 77	500 Hours with 100 hours for checkout and 400 hours for data-taking
Completed	7 Nov, 79	1,650 Hours see exp #650

568 EMULSION/PI- @ 300 #568 — **Jacques D. Hebert**

BEAM: Neutrino Area - Miscellaneous
300 GEV PION INTERACTIONS IN NUCLEAR EMULSION.

UNIVERSITY OF BELGRADE(YUGOSLAVIA)
CRN, STRASBOURG (FRANCE)
FERMILAB
UNIVERSITY OF LUND (SWEDEN)
UNIVERSITY OF NANCY (FRANCE)
UNIVERSITY OF OTTAWA (CANADA)
UNIV. OF PARIS VI, LPG (FRANCE)
LRC, LYON (FRANCE)
UNIVERSITY OF SANTANDER (SPAIN)
UNIVERSITY OF VALENCIA (SPAIN)

Request	8 Aug, 77	Emulsion Exposure of 3 stacks in a negative beam of about 30K particles per cm sq.
Approval	16 Sep, 77	Emulsion Exposure of 3 stacks in a 300 GeV negative beam with a flux of 30K particles per cm sq over an area of 3 x 3 cm sq
Completed	15 Jan, 78	3 Stack(s)

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570 30-INCH HYBRID #570 — **Irwin A. Pless**

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL FOR A STUDY OF PARTICLE PRODUCTION AND DYNAMICS FROM X = 0 TO X = 1 AND THE DEPENDENCE ON INCIDENT QUANTUM NUMBERS.
(Supercedes proposal #488. Will use the forward gamma detector and the downstream ISIS system with the 30-inch hybrid spectrometer.)

BROWN UNIVERSITY
FERMILAB
COLLEGE DE FRANCE (FRANCE)
INDIANA UNIVERSITY
MASSACHUSETTS INST. OF TECHNOLOGY
NIJMEGEN UNIVERSITY (NETHERLANDS)
OAK RIDGE NATIONAL LABORATORY
RUTGERS UNIVERSITY
STEVENS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF TEL-AVIV (ISRAEL)
UNIVERSITY OF TENNESSEE, KNOXVILLE
TOHOKU GAKUIN UNIVERSITY (JAPAN)
TOHOKU UNIVERSITY (JAPAN)
YALE UNIVERSITY

Request	16 Sep, 77	2,000 K Pix to be taken with the 30-inch hybrid spectrometer exposed to two beams, 1,000K pix in a positive beam with 10% K+ and equal fractions of protons and pi+, and 1,000K pix in a negative beam with 20% pbars
Approval	16 Mar, 78	1,500 Hours for a run of 15 weeks duration; combined with exp #565
Completed	1 Jun, 82	1,068 K Pix total for E-565 and E-570

573 EMULSION/PI- @ 300 #573 — **Noriyuki Ushida**

BEAM: Neutrino Area - Miscellaneous
A SEARCH FOR CHARMED PARTICLES PRODUCED BY 300 GEV/C NEGATIVE PIONS IN NUCLEAR EMULSION.

AICHI UNIV. OF EDUCATION (JAPAN)
NAGOYA UNIVERSITY (JAPAN)
YOKOHAMA NATIONAL UNIV. (JAPAN)

Request	29 Nov, 77	3 Stack(s) exposed in a negative pion beam to an integrated flux of 7.5 x 10 to the 3rd particles per cm sq
Approval	29 Nov, 77	3 Stack(s)
Completed	15 Jan, 78	3 Stack(s)

574 EMULSION/PI- @ 300 #574 — **Wladyslaw Wolter**

BEAM: Neutrino Area - Miscellaneous
A STUDY OF THE MECHANISM FOR MULTIPLE PRODUCTION OF PARTICLES AT OR ABOVE 300 GEV PION INTERACTIONS IN NUCLEAR EMULSION.

INP, KRAKOW (POLAND)

Request	1 Dec, 77	3 Stack(s) exposed in a 300 GeV negative pion beam to an integrated intensity of 5 x 10 to the 4th particles per cm sq
Approval	1 Dec, 77	3 Stack(s)
Completed	18 Jan, 78	4 Stack(s)

575 EMULSION/PROTONS @ 400 #575 — **Jere J. Lord**

BEAM: Neutrino Area - Miscellaneous
PROPOSAL TO STUDY 400 GEV PROTON INTERACTIONS IN NUCLEAR EMULSION.

UNIVERSITY OF WASHINGTON

Request	13 Dec, 77	2 Stack(s) to be exposed in a 400 GeV proton beam focused to a diameter of less than 5-10 mm. One stack to receive a total dose of 100K p/cm sq and the other 200K p/cm sq.
Approval	13 Dec, 77	2 Stack(s)
Completed	15 Jan, 78	2 Stack(s)

576 EMULSION/PROTONS @ 500 #576 — **Jacques D. Hebert**

BEAM: Neutrino Area - Miscellaneous
500 GEV PROTON INTERACTIONS IN NUCLEAR EMULSION

UNIVERSITY OF BELGRADE(YUGOSLAVIA)
CRN, STRASBOURG (FRANCE)
FERMILAB
UNIVERSITY OF LUND (SWEDEN)
UNIVERSITY OF LYON (FRANCE)
UNIVERSITY OF NANCY (FRANCE)
UNIVERSITY OF OTTAWA (CANADA)
UNIV. OF PARIS VI, LPG (FRANCE)
UNIVERSITY OF SANTANDER (SPAIN)
UNIVERSITY OF VALENCIA (SPAIN)

Request	21 Dec, 77	Emulsion Exposure exposed in a 500 GeV proton beam to a total integrated flux of 3 x 10 to the 4th particles per cm sq
Approval	20 Feb, 78	Emulsion Exposure
Completed	11 Jul, 85	1 Emulsion Stack(s)

577 ELASTIC SCATTERING #577 — **Roy Rubinstein**

BEAM: Meson Area - M6 Beam
PROPOSAL TO MEASURE PI P ELASTIC SCATTERING AT LARGE ANGLES.

UNIVERSITY OF ARIZONA
UNIV. OF CALIFORNIA, SAN DIEGO
CORNELL UNIVERSITY
FERMILAB

Request	30 Jan, 78	1,000 Hours to be run in a 200 GeV incident beam with a beam flux between 5 x 10 to the 7th and 5 x 10 to the 8th pions per pulse
Approval	29 Jun, 78	1,000 Hours
Completed	16 Mar, 81	1,550 Hours

580 PARTICLE SEARCH #580 — **Daniel R. Green**

BEAM: Meson Area - M6 Beam
A SEARCH FOR NARROW AND BROAD RESONANCES DECAYING INTO LAMBDA-LAMBDA BAR, LAMBDA-LAMBDA BAR-PI, K SHORT AND K SHORT-K SHORT-PI FROM PI- P INTERACTIONS AT 300 GEV USING THE FERMILAB MPS.

UNIVERSITY OF ARIZONA
FERMILAB
FLORIDA STATE UNIVERSITY
NOTRE DAME UNIVERSITY
TUFTS UNIVERSITY
VANDERBILT UNIVERSITY
VIRGINIA POLYTECHNIC INSTITUTE

Request	31 Jan, 78	800 Hours to be run in a pion beam with an incident flux of 1.5 x 10 to the 6th pions per pulse at 300 GeV
Approval	29 Jun, 78	800 Hours
Completed	1 Jun, 81	800 Hours

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581 POLARIZED SCATTERING #581 — **Akihiko Yokosawa**

BEAM: Meson Area - Polarized Proton Beam
CONSTRUCTION OF A POLARIZED BEAM FACILITY IN THE MESON LABORATORY AND EXPERIMENTS USING SUCH A FACILITY.
(Using the M2-beam converted to a polarized proton/antiproton beam.)

ARGONNE NATIONAL LABORATORY
CEN-SACLAY (FRANCE)
FERMILAB
HIROSHIMA UNIVERSITY (JAPAN)
UNIVERSITY OF IOWA
KYOTO SANGYO UNIVERSITY (JAPAN)
KYOTO UNIVERSITY (JAPAN)
KYOTO UNIV. OF EDUCATION (JAPAN)
LAPP, D'ANNECY-LE-VIEUX (FRANCE)
LOS ALAMOS NATIONAL LABORATORY
NORTHWESTERN UNIVERSITY
UN. OF OCCUP. & ENV. HEALTH(JAPAN)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
RICE UNIVERSITY
UNIVERSITY DI TRIESTE (ITALY)
UNIVERSITY OF UDINE (ITALY)

Request	31 Jan, 78	1,200 Hours to include-	600 hours for total cross section difference measurements 600 hours for asymmetry measurements in inclusive pion production
	30 Jan, 79	1,670 Hours to include-	200 hours for beam measurements 1,000 hours for high p-transverse physics 220 hours for cross section measurements 250 hours for hadron production at large-x
Approval	27 Nov, 79	Unspecified	approval for the construction of a polarized beam only There is no approval yet for any experiment to use the beam.
Approved/Inactive	10 Feb, 84	Unspecified	

584 PARTICLE SEARCH #584 — **Bruce D. Winstein**

BEAM: Meson Area - M3 Beam
PROPOSAL TO SEARCH FOR THE DECAY OF NEW LONG-LIVED NEUTRAL PARTICLES WITH A MASS AND LIFETIME EXCEEDING THAT OF THE K LONG.

UNIVERSITY OF CHICAGO
STANFORD UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

Request	31 Jan, 78	300 Hours	to be run in the M3 beam as modified for experiment #533
Approval	29 Jun, 78	300 Hours	with low priority
Completed	22 Jan, 80	400 Hours	

585 KAON CHARGE EXCHANGE #585 — **William R. Francis**

BEAM: Meson Area - M4 Beam
A PROPOSAL TO STUDY EXCLUSIVE KN CHARGE EXCHANGE AT FERMILAB.
(The spectrometer from experiment #383 would be used.)

UNIV. OF CALIFORNIA, DAVIS
UNIV. OF CALIFORNIA, SAN DIEGO
CARELTON UNIVERSITY (CANADA)
MICHIGAN STATE UNIVERSITY

Request	31 Jan, 78	600 Hours	to be run immediately following the conclusion of exp #383
	13 Nov, 78	2,700 Hours	for 7 weeks of data to finish K- running and 9 weeks to repeat the experiment with a K+ beam and a deuterium target
Approval	16 Mar, 78	600 Hours	with conditions before the Meson Laboratory pause
	21 Dec, 78	1,800 Hours	with the approval of an additional 7 weeks of running to finish K- data; no commitment is made to K+ running
Completed	16 Mar, 81	3,150 Hours	

591 PARTICLE SEARCH #591 — **Laszlo J. Gutay**

BEAM: Internal Target Area (C-0)
BROAD SEARCH FOR NEW HADRONIC STATES VIA HIGH RESOLUTION CHARGE AND MASS DETERMINATION OF NUCLEAR FRAGMENTS.

FERMILAB
PURDUE UNIVERSITY

Request	31 Jan, 78	800 Hours	to include 200 hours for setup and 600 hours for data
Approval	21 Apr, 78	800 Hours	
Completed	8 Feb, 81	1,950 Hours	

592 NUCLEAR SCALING #592 — **Sherman Frankel**

BEAM: Proton Area - West
PROPOSAL FOR EXPERIMENTAL STUDY OF THE RELATIONSHIP BETWEEN HADRONIC AND NUCLEAR SCALING AT VERY HIGH ENERGIES.

ITEP, MOSCOW (RUSSIA)
UNIVERSITY OF PENNSYLVANIA
COLLEGE OF WILLIAM AND MARY

Request	31 Jan, 78	300 Hours	to be run in a 400 GeV proton beam at an upstream location in P-West
Approval	17 Mar, 78	300 Hours	to be run in such a manner as not to interfere with the installation of the P-West pion beam
Completed	17 Jul, 78	500 Hours	

594 NEUTRINO #594 — **James K. Walker**

BEAM: Neutrino Area - Dichromatic
PROPOSAL FOR A NEW NEUTRINO DETECTOR AT FERMILAB.

FERMILAB
ILLINOIS INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INST. OF TECHNOLOGY
MICHIGAN STATE UNIVERSITY
NORTHERN ILLINOIS UNIVERSITY

Request	1 Feb, 78	2,500 Hours for data to include:	Experiment A (a study of semi-leptonic neutral current reactions) to require 6 x 10 to the 18th protons utilizing the narrow band beam at 250 GeV Experiment B (neutrino electron elastic scattering) to require 6 x 10 to the 18th protons utilizing the two-horn beam
Approval	16 Mar, 78	Unspecified	
Completed	14 Jun, 82	4,400 Hours	

595 PARTICLE SEARCH #595 — **Arie Bodek**

BEAM: Neutrino Area - 15 ft. Hadron Beam
A STUDY OF CHARM AND OTHER NEW FLAVORS PRODUCED IN PION-NUCLEON COLLISIONS.
(Continuation of work begun in exp #379.)

CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIVERSITY OF CHICAGO
FERMILAB
UNIVERSITY OF ROCHESTER
STANFORD UNIVERSITY

Request	1 Feb, 78	1,000 Hours	to include 400 hours at 300 GeV with an incident intensity of 10 to the 5th pi- per pulse and 400 hours at 250-300 GeV with incident intensity of 10 to the 6th pi- per pulse
Approval	29 Jun, 78	600 Hours	for the low-pt part of the experiment
Completed	16 Jun, 80	1,450 Hours	

596 PARTICLE SEARCH #596 — **Leon M. Lederman**

BEAM: Neutrino Area - Muon/Hadron Beam
ON SEARCHING FOR HEAVY STABLE PARTICLES
(A continuation of work begun with exp #187.)

COLUMBIA UNIVERSITY
FERMILAB
SUNY AT STONY BROOK

Request	3 Feb, 78	150 Hours	to be run with the beam tuned to 75 GeV and assuming 10 to the 13th primary protons incident per pulse
Approval	1 May, 78	150 Hours	
Completed	21 May, 78	200 Hours	

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(continued)

597 30-INCH HYBRID #597 — **J. James Whitmore**

BEAM: Neutrino Area - 30 in. Hadron Beam
PROPOSAL FOR A HIGH STATISTICS STUDY OF PBAR-P ANNIHILATIONS AND A COMPARISON OF PBAR, P, PI+-, AND K+ INTERACTIONS ON HYDROGEN, MAGNESIUM, AND GOLD AT 100 GEV/C UTILIZING THE FERMILAB 30-INCH HYDROGEN BUBBLE CHAMBER.
(The use of thin metallic foil targets in the hydrogen is requested.)

UNIVERSITY OF CAMBRIDGE (ENGLAND)
DUKE UNIVERSITY
FERMILAB
UNIVERSITY OF KANSAS
MICHIGAN STATE UNIVERSITY
NOTRE DAME UNIVERSITY

Request	3 Feb, 78	1,450 K Pix to be taken as follows- 1,000K pix in negative beam @ 100 GeV 400K pix in positive beam @ 100 GeV 50K pix in negative beam @ 360 GeV
Approval	16 Mar, 78	1,000 Hours for a run of 10 weeks duration
Completed	3 May, 82	658 K Pix

605 HIGH MASS PAIRS #605 — **John P. Rutherfoord**

BEAM: Meson Area - East
A STUDY OF LEPTONS AND HADRONS NEAR THE KINEMATIC LIMITS.
(Using an apparatus with higher luminosity and acceptance than experiment #288.)

CEN-SACLAY (FRANCE)
CERN (SWITZERLAND)
COLUMBIA UNIVERSITY
FERMILAB
KEK (JAPAN)
KYOTO UNIVERSITY (JAPAN)
SUNY AT STONY BROOK
UNIVERSITY OF WASHINGTON

Request	9 May, 78	4,000 Hours to be run with an incident intensity greater than 10 to the 13th protons/pulse at an energy of at least 400 GeV
	28 Nov, 78	4,000 Hours in the Phase I configuration. an incident beam of 400 GeV protons would be needed with an intensity of 3 x 10 to the 12th per pulse
Approval	19 Mar, 79	1,000 Hours with the Phase I detector
Completed	29 Aug, 85	3,970 Hours

608 PARTICLE SEARCH #608 — **Charles N. Brown**

BEAM: Proton Area - Center
A SEARCH FOR THE ETA SUB C IN HADRONIC INTERACTIONS.
(Using the spectrometer from exp #288/494.)

COLUMBIA UNIVERSITY
FERMILAB
SUNY AT STONY BROOK

Request	28 Sep, 78	100 Hours in the P-center proton beam at an incident intensity of 3 x 10 to the 9th protons per pulse
Approval	25 Jan, 79	Parasitic Running
Completed	7 Mar, 79	600 Hours

609 HADRON JETS #609 — **Walter Sciove**

BEAM: Meson Area - M6 Beam
A STUDY OF THE STRUCTURE OF HIGH P TRANSVERSE HADRONIC INTERACTIONS.
(This proposal supersedes P-246.)

ARGONNE NATIONAL LABORATORY
FERMILAB
LEHIGH UNIVERSITY
UNIVERSITY OF PENNSYLVANIA
RICE UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

Request	2 Oct, 78	1,500 Hours for Phase 1 to be run in a beam with 400 GeV capability with at least 10 to the 8th protons per sec incident Phase 2 would include addition of a large aperture magnet, Cerenkov imaging device and PWC's; Phase 3 would include a request for a higher energy beam
Approval	16 Nov, 78	Unspecified with conditions
	30 Jan, 80	1,500 Hours
Completed	14 Feb, 84	620 Hours

610 PARTICLE SEARCH #610 — **Thomas B. W. Kirk**

BEAM: Neutrino Area - Muon/Hadron Beam
PION PRODUCTION OF HEAVY QUARK MESON STATES DECAYING INTO THE PSI/J (3097).
(Continuation of work begun in exp #369 but with upgraded cyclotron spectrometer.)

FERMILAB
HOWARD UNIVERSITY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
UNIVERSITY OF PENNSYLVANIA
PURDUE UNIVERSITY
TUFTS UNIVERSITY

Request	2 Oct, 78	1,000 Hours to be run with an incident intensity of 10 to the 13th protons per pulse on the production target
Approval	21 Dec, 78	1,000 Hours with a schedule yet to be formally determined
Completed	23 Jun, 80	1,250 Hours see proposal #673

612 PHOTON DISSOCIATION #612 — **Konstantin Goulianos**

BEAM: Proton Area - East
A PROPOSAL TO MEASURE THE DIFFRACTIVE PHOTON DISSOCIATION ON HYDROGEN.

ROCKEFELLER UNIVERSITY

Request	2 Oct, 78	1,150 Hours to be run in the tagged photon beam with 10 to the 6th incident photons per pulse
Approval	15 Nov, 78	1,150 Hours
Completed	12 Apr, 82	1,850 Hours

613 BEAM DUMP #613 — **Byron P. Roe**

BEAM: Meson Area - M2 Beam
PROPOSAL FOR A PROMPT NEUTRINO EXPERIMENT AT FERMILAB.

UNIVERSITY OF FIRENZE (ITALY)
UNIVERSITY OF MICHIGAN
OHIO STATE UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

Request	2 Oct, 78	1,000 Hours to obtain an exposure of 1 - 2 x 10 to the 17th protons with an incident intensity of 1 x 10 to the 12th protons/pulse
Approval	15 Nov, 78	1,000 Hours with an expected reassessment of physics priorities and possible implications for this experiment in the fall of 1979
Completed	13 May, 82	1,800 Hours

615 FORWARD SEARCH #615 — **Kirk T. McDonald**

BEAM: Proton Area - West
A STUDY OF THE FORWARD PRODUCTION OF MASSIVE PARTICLES. IN PHASE ONE THE FORWARD PRODUCTION OF MUON PAIRS WOULD BE STUDIED.
(Using a forward spectrometer with mass selection.)

UNIVERSITY OF CHICAGO
FERMILAB
IOWA STATE UNIVERSITY
PRINCETON UNIVERSITY

Request	28 Nov, 78	1,000 Hours to be run in a 50-GeV pion beam at an incident intensity of 10 to the 10th pions per pulse
	7 May, 79	1,000 Hours to include 600 hours of running with 250 GeV pions and 200 hours with 75 GeV pions. A primary proton intensity of 10 to the 13th per pulse on the P-West production target and 500 pulses per hour are assumed.
Approval	1 Jul, 79	1,000 Hours
Completed	14 Jul, 84	2,260 Hours

616 NEUTRINO #616 — **Frank Sciulli**

BEAM: Neutrino Area - Dichromatic
PROPOSAL TO MEASURE NEUTRINO STRUCTURE FUNCTIONS.
(Use of the Lab E neutrino detector to continue work begun in exp #356.)

CALIFORNIA INSTITUTE OF TECHNOLOGY
COLUMBIA UNIVERSITY
FERMILAB
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY

Request	29 Jan, 79	3,200 Hours to include specifically 600 hours for checkout, calibration and background studies, and 2 x 10 to the 19th protons at 400 GeV for data
Approval	19 Mar, 79	4,000 Hours approximately or 2 x 10 to the 19th protons to be combined with running for exp #356
Completed	22 Jan, 80	2,900 Hours

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617 CP VIOLATION #617 — **Bruce D. Winstein**

CEN-SACLAY (FRANCE)
UNIVERSITY OF CHICAGO

BEAM: Meson Area - M3 Beam
A STUDY OF DIRECT CP VIOLATION IN THE DECAY OF THE NEUTRAL KAON VIA A PRECISION MEASUREMENT OF THE RATIO OF ETA 00 TO ETA +-.

Request	30 Jan, 79	1,000 Hours for data
Approval	19 Mar, 79	1,000 Hours
Completed	14 Jun, 82	2,300 Hours

619 TRANSITION MAGNETIC MOMENT #619 — **Thomas J. Devlin**

UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Proton Area - Center
A MEASUREMENT OF THE SIGMA-ZERO TO LAMBDA TRANSITION MAGNETIC MOMENT.

Request	7 May, 79	250 Hours to be run in the diffracted proton beam (normally 400 GeV) at an intensity between 10 to the 8th and 10 to the 9th protons per pulse with a 1-sec spill
Approval	1 Jul, 79	250 Hours
Completed	14 Jun, 82	675 Hours

620 CHARGED HYPERON MAG MOMENT #620 — **Lee G. Pondrom**

UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M2 Beam
PROPOSAL TO MEASURE THE MAGNETIC MOMENTS OF THE SIGMA +, SIGMA -, XI -, AND OMEGA - HYPERONS USING THE FERMILAB NEUTRAL HYPERON BEAM.

Request	7 May, 79	300 Hours to be run in the diffracted proton beam (350 to 400 GeV) at an intensity of 10 to the 9th protons per pulse and a 1-sec spill
Approval	1 Jul, 79	300 Hours
Completed	22 Jan, 80	900 Hours

621 CP VIOLATION #621 — **Gordon B. Thomson**

UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
RUTGERS UNIVERSITY

BEAM: Proton Area - Center
A MEASUREMENT OF THE CP VIOLATION PARAMETER ETA +-0.
(Use of the neutral hyperon spectrometer is assumed.)

Request	7 May, 79	1,200 Hours to be run in 2 phases consisting of 200 hours for Phase 1 with some modifications to the present apparatus 1000 hours for Phase 2 at a later date after results from Phase 1 have been analyzed
Approval	1 Jul, 81	Unspecified
Completed	29 Aug, 85	2,470 Hours

622 QUARK #622 — **H. Richard Gustafson**

UNIVERSITY OF MICHIGAN

BEAM: Meson Area - M2 Beam
PROPOSAL TO SEARCH FOR FRACTIONAL CHARGE PARTICLES FROM A MAGNETIZED BEAM DUMP.

Request	7 May, 79	100 Hours to be run partially in conjunction with exp #361 using the beam dump from that experiment
Approval	1 Jul, 79	Parasitic Running in a mode that is not to interfere with the operation of exp #361
Completed	23 Jun, 80	Unspecified

623 PARTICLE SEARCH #623 — **Daniel R. Green**

UNIVERSITY OF ARIZONA
FERMILAB
FLORIDA STATE UNIVERSITY
NOTRE DAME UNIVERSITY
TUFTS UNIVERSITY
VANDERBILT UNIVERSITY
VIRGINIA POLYTECHNIC INSTITUTE

BEAM: Meson Area - M6 Beam
PROPOSAL TO STUDY HIGH MASS STATES DECAYING INTO PHI-PI AND PHI-PHI PAIRS PRODUCED CENTRALLY IN 300 GEV/C PI MINUS PROTON INTERACTIONS.
(Use of the Fermilab multiparticle spectrometer facility is assumed.)

Request	7 May, 79	1,000 Hours to be run in a 300 GeV/c beam of negative pions at an intensity of a few times 10 to the 6th pions per pulse
Approval	14 Nov, 80	500 Hours to be run before 1983
Completed	14 Jun, 82	425 Hours

629 DIRECT PHOTON PRODUCTION #629 — **Charles A. Nelson, Jr.**

FERMILAB
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF MINNESOTA
NORTHEASTERN UNIVERSITY
UNIVERSITY OF ROCHESTER
TEXAS A&M UNIVERSITY

BEAM: Meson Area - M1 Beam
DIRECT PHOTON PRODUCTION IN HADRON NUCLEUS COLLISIONS.

Request	25 Feb, 80	600 Hours to include 200 hrs for set up, 400 hrs for data
Approval	7 Jul, 80	Unspecified approved as a test in the M-1 beam line in the fall of 1980
Completed	9 Mar, 81	600 Hours

630 CHARM PARTICLE #630 — **Jack Sandweiss**

FERMILAB
LAWRENCE BERKELEY LABORATORY
YALE UNIVERSITY

BEAM: Proton Area - Center
STUDY OF B PARTICLE AND CHARMED PARTICLE PRODUCTION AND DECAY USING A HIGH RESOLUTION STREAMER CHAMBER.

Request	26 Feb, 80	600 Hours
Approval	15 Mar, 80	600 Hours
Completed	15 Mar, 82	1,150 Hours

631 NUC CALIBRATION CROSS SECT #631 — **Samuel I. Baker**

BROOKHAVEN NATIONAL LABORATORY
CERN (SWITZERLAND)
FERMILAB

BEAM: Neutrino Area - Miscellaneous
A MEASUREMENT OF NUCLEAR CALIBRATION CROSS SECTIONS FOR PROTONS BETWEEN 100 AND 1000 GEV.

Request	26 Feb, 80	25 Exposure(s)
Approval	15 Dec, 80	Unspecified in neutrino area
Completed	1 Jun, 81	41 Exposure(s)

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632 15-FT NEUTRINO/H2 & NE #632 — **Douglas R. O. Morrison and Michael W. Peters**

BEAM: Neutrino Area - Center

AN EXPOSURE OF THE 15-FOOT BUBBLE CHAMBER WITH A NEON-HYDROGEN MIXTURE TO A WIDEBAND NEUTRINO BEAM FROM THE TEVATRON.

UNIVERSITY OF BIRMINGHAM (ENGLAND)
UNIV. OF CALIFORNIA, BERKELEY
CEN-SACLAY (FRANCE)
CERN (SWITZERLAND)
FERMILAB
UNIVERSITY OF HAWAII AT MANOA
ILLINOIS INSTITUTE OF TECHNOLOGY
IMPERIAL COLLEGE (ENGLAND)
JAMMU UNIVERSITY (INDIA)
UNIVERSITY OF LIBRE (BELGIUM)
MAX-PLANCK INSTITUTE (GERMANY)
MOSCOW STATE UNIVERSITY (RUSSIA)
ITEP, MOSCOW (RUSSIA)
UNIVERSITY OF OXFORD (ENGLAND)
PANJAB UNIVERSITY (INDIA)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
RUTGERS UNIVERSITY
TUFTS UNIVERSITY

Request	25 Apr, 80	250 K Pix
Approval	18 Jun, 82	1 E18th Protons Stage I approval.
	15 Dec, 83	1 E18th Protons Stage II approval.
Completed	1 Feb, 88	446 K Pix

635 NEUTRINO #635 — **Luke W. Mo**

BEAM: Neutrino Area - Prompt Beam

PROPOSAL TO MEASURE MUON NEUTRINO ELECTRON AND MUON ANTI-NEUTRINO ELECTRON ELASTIC SCATTERING, NEUTRINO OSCILLATIONS, AND DECAYS OF LONG-LIVED NEUTRAL PARTICLES AT THE TEVATRON OF FERMILAB.

FERMILAB
VIRGINIA POLYTECHNIC INSTITUTE

Request	25 Apr, 80	... 3 x 10 to the 18th protons
	16 Mar, 83	Unspecified
Approval	12 Nov, 83	Unspecified Stage I approval.
Approved/Inactive	1 Feb, 88	Unspecified

636 BEAM DUMP #636 — **Toshio Kitagaki and Irwin A. Pless**

BEAM: Neutrino Area - Prompt Beam

NEUTRINO INTERACTION STUDIES WITH A HEAVY LIQUID BUBBLE CHAMBER AT TEVATRON ENERGIES USING A BEAM DUMP TECHNIQUE TO PRODUCE THE NEUTRINO BEAM.

IHEP, BEIJING (PRC)
BROWN UNIVERSITY
FERMILAB
INDIANA UNIVERSITY
MASSACHUSETTS INST. OF TECHNOLOGY
OAK RIDGE NATIONAL LABORATORY
TECHNION-ISRAEL INST (ISRAEL)
UNIVERSITY OF TEL-AVIV (ISRAEL)
UNIVERSITY OF TENNESSEE, KNOXVILLE
TOHOKU GAKUIN UNIVERSITY (JAPAN)
TOHOKU UNIVERSITY (JAPAN)

Request	25 Apr, 80	2.5 E18th Protons
Approval	14 Nov, 80	Unspecified
Approved/Inactive	1 Feb, 88	Unspecified

646 15-FT BEAM DUMP #646 — **Michael W. Peters**

BEAM: Neutrino Area - Prompt Beam

SEARCH FOR THE TAU NEUTRINO AND STUDY OF ELECTRON NEUTRINO AND ELECTRON ANTI-NEUTRINO INTERACTIONS.

UNIV. OF CALIFORNIA, BERKELEY
FERMILAB
UNIVERSITY OF HAWAII AT MANOA
ILLINOIS INSTITUTE OF TECHNOLOGY
RUTGERS UNIVERSITY
STEVENS INSTITUTE OF TECHNOLOGY
TUFTS UNIVERSITY

Request	25 Apr, 80	2 E18th Protons
Approval	1 Jul, 81	Unspecified
Approved/Inactive	1 Feb, 88	Unspecified

650 PARTICLE SEARCH #650 — **Robert C. Webb**

BEAM: Proton Area - West

REQUEST FOR A CONTINUATION OF E-567.

BROOKHAVEN NATIONAL LABORATORY
CEN-SACLAY (FRANCE)
PRINCETON UNIVERSITY
TEXAS A&M UNIVERSITY
UNIVERSITY OF TORINO (ITALY)

Request	29 Apr, 80	500 Hours
Approval	7 Jul, 80	500 Hours expected to run in the spring 1981 running period.
Completed	29 Dec, 80	550 Hours

653 PARTICLE SEARCH #653 — **Neville W. Reay**

BEAM: Neutrino Area - East

A PROPOSAL TO MEASURE CHARM AND B DECAYS VIA HADRONIC PRODUCTION IN A HYBRID EMULSION SPECTROMETER.

AICHI UNIV. OF EDUCATION (JAPAN)
UNIV. OF CALIFORNIA, DAVIS
CARNEGIE-MELLON UNIVERSITY
CHONNAM NATIONAL UNIVERSITY(KOREA)
FERMILAB
GIFU UNIVERSITY (JAPAN)
GYEONGSANG NATIONAL UNIV. (KOREA)
KINKI UNIVERSITY (JAPAN)
KOBE UNIVERSITY (JAPAN)
KOREA UNIVERSITY, SEOUL (KOREA)
NAGOYA INST. OF TECHNOLOGY (JAPAN)
NAGOYA UNIVERSITY (JAPAN)
OHIO STATE UNIVERSITY
OKAYAMA UNIVERSITY (JAPAN)
UNIVERSITY OF OKLAHOMA
OSAKA CITY UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)
TOHO UNIVERSITY (JAPAN)
UTSUNOMIYA UNIVERSITY (JAPAN)
WON KWANG UNIVERSITY, IRI (KOREA)

Request	1 May, 80	1,500 Hours
Approval	1 Jul, 81	Unspecified
Completed	15 Feb, 88	1,800 Hours

660 CHANNELING #660 — **Walter M. Gibson**

BEAM: Meson Area - M4 Beam

PROPOSAL TO STUDY THE EFFECT OF BENT CRYSTALS ON CHANNELING NEAR THE CRITICAL RADIUS OF BENDING.

CERN (SWITZERLAND)
CHALK RIVER NUCLEAR LAB. (CANADA)
FERMILAB
JINR, DUBNA (RUSSIA)
UNIVERSITY OF NEW MEXICO
SUNY AT ALBANY
UNIVERSITY OF STRASBOURG (FRANCE)

Request	10 Jun, 80	300 Hours
Approval	14 Nov, 80	400 Hours
Completed	13 Jun, 82	425 Hours

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663 LAMBDA POLARIZATION #663 — **Hans G. E. Kobrak**

BEAM: Meson Area - M6 Beam
COMPARISON OF POLARIZATION OF INCLUSIVELY PRODUCED LAMBDAS AND ANTILAMBDAS BY PROTONS, ANTIPROTONS, KAONS AND PIONS ON HYDROGEN.

UNIV. OF CALIFORNIA, DAVIS
UNIV. OF CALIFORNIA, SAN DIEGO
CARELTON UNIVERSITY (CANADA)
FERMILAB
MICHIGAN STATE UNIVERSITY

Request	29 Sep, 80	1,000 Hours
Approval	14 Nov, 80	800 Hours must be completed by July 1, 1981
Completed	1 Jun, 81	500 Hours

665 TEVATRON MUON #665 — **Heidi M. Schellman**

BEAM: Neutrino Area - Muon Beam
MUON SCATTERING WITH HADRON DETECTION AT THE TEVATRON.

ARGONNE NATIONAL LABORATORY
UNIV. OF CALIFORNIA, SAN DIEGO
FERMILAB
FREIBURG UNIVERSITY (GERMANY)
HARVARD UNIVERSITY
UNIV. OF ILLINOIS, CHICAGO CIRCLE
INP, KRAKOW (POLAND)
LAWRENCE LIVERMORE LABORATORY
UNIVERSITY OF MARYLAND
MASSACHUSETTS INST. OF TECHNOLOGY
MAX-PLANCK INSTITUTE (GERMANY)
NORTHWESTERN UNIVERSITY
OHIO UNIVERSITY
UNIVERSITY OF PENNSYLVANIA
UNIVERSITY OF WASHINGTON
UNIVERSITY OF WUPPERTAL (GERMANY)
YALE UNIVERSITY

Request	3 Oct, 80	3,000 Hours
Approval	1 Jul, 81	1,000 Hours
	30 Jan, 89	... Tracking system upgrade.
Completed	8 Jan, 92	Unspecified

666 EMULSION EXPOSURE #666 — **Richard J. Wilkes**

BEAM: Proton Area - Center
EMULSION EXPOSURE TO SIGMA MINUS BEAM AT FERMILAB.

INP, KRAKOW (POLAND)
UNIVERSITY OF WASHINGTON

Request	2 Dec, 80	1 K Pix
Approval	2 Dec, 80	Unspecified
Completed	9 Mar, 81	6 Stack(s)

667 EMULSION/PI- @ 500 #667 — **Wladyslaw Wolter**

BEAM: Proton Area - East
STUDY OF PION-NUCLEUS INTERACTIONS IN PURE EMULSION STACKS AND EMULSION CHAMBERS AT ENERGY ABOVE 500 GEV.

INP, KRAKOW (POLAND)
LEBEDEV PHYSICAL INST. (RUSSIA)
LOUISIANA STATE UNIVERSITY
TASHKENT, PHY.TEC.INS (UZBEKISTAN)

Request	2 Dec, 80	Emulsion Exposure
Approval	28 Mar, 90	Unspecified
Completed	27 Aug, 90	Unspecified

668 EMULSION/PI- @ 800 #668 — **Wladyslaw Wolter**

BEAM: Unspecified Beam
STUDY OF PION NUCLEUS INTERACTIONS IN PURE EMULSION STACKS AND EMULSION CHAMBERS AT ENERGY ABOVE 800 GEV.

INP, KRAKOW (POLAND)

Request	2 Dec, 80	Emulsion Exposure
Completed	26 Apr, 85	Emulsion Exposure

672A HADRON JETS #672A — **Andrzej Zieminski**

BEAM: Meson Area - West
A STUDY OF HADRONIC FINAL STATES PRODUCED IN ASSOCIATION WITH HIGH-PT JETS AND HIGH-MASS DIMUONS.

FERMILAB
UNIV. OF ILLINOIS, CHICAGO CIRCLE
INDIANA UNIVERSITY
UNIVERSITY OF LOUISVILLE
UNIVERSITY OF MICHIGAN
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)

Request	1 Feb, 81	2,000 Hours for data taking plus 500 hours for setup and testing
Approval	1 Jul, 81	Unspecified
Completed	8 Jan, 92	Unspecified

673 CHI MESON #673 — **John W. Cooper**

BEAM: Neutrino Area - Muon/Hadron Beam
CHI MESON PRODUCTION BY HADRONS.
(E-610 extension.)

FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
UNIVERSITY OF PENNSYLVANIA
PURDUE UNIVERSITY
TUFTS UNIVERSITY

Request	1 Feb, 81	1,500 Hours to be run with Dichromatic train during the fall 1981 period
Approval	1 Jul, 81	Unspecified
Completed	14 Apr, 82	1,100 Hours

683 PHOTOPRODUCTION OF JETS #683 — **Marjorie D. Corcoran**

BEAM: Proton Area - Broad Band
PHOTOPRODUCTION OF HIGH PT JETS.

BALL STATE UNIVERSITY
FERMILAB
UNIVERSITY OF IOWA
LEHIGH UNIVERSITY
UNIVERSITY OF MARYLAND
UNIVERSITY OF MICHIGAN
RICE UNIVERSITY
UNIVERSITY OF TEXAS AT AUSTIN
VANDERBILT UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

Request	1 Feb, 81	1,200 Hours including 500 hours for tune-up, calibration and some hadron beam running
Approval	15 Dec, 83	Unspecified Stage I approval.
	4 Apr, 87	Unspecified Stage II approval.
Completed	8 Jan, 92	Unspecified

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687 PHOTOPRODUCTION OF CHARM AND B #687 — **Joel N. Butler and John P. Cumalat**

BEAM: Proton Area - Broad Band
HIGH ENERGY PHOTOPRODUCTION OF STATES CONTAINING HEAVY QUARKS AND OTHER RARE PHENOMENA.

UNIV. OF CALIFORNIA, DAVIS
UNIVERSITY OF COLORADO AT BOULDER
FERMILAB
INFN, FRASCATI (ITALY)
UNIVERSITY OF ILLINOIS, CHAMPAIGN
INFN, MILANO (ITALY)
UNIVERSITY OF MILANO (ITALY)
UNIVERSITY OF NORTH CAROLINA
NORTHWESTERN UNIVERSITY
NOTRE DAME UNIVERSITY
UNIVERSITY OF PAVIA (ITALY)
UNIVERSITY OF PUERTO RICO

Request	1 Feb, 81	2,000 Hours including a 500 hour run with a thick target and a beam dump and another 1500 hour run with an open geometry
Approval	1 Jul, 81	Unspecified Stage I approval.
	15 Dec, 83	Unspecified Stage II approval.
Completed	8 Jan, 92	Unspecified

690 PARTICLE SEARCH #690 — **Bruce Knapp**

BEAM: Neutrino Area - East
STUDY OF HADRONIC PRODUCTION AND SPECTROSCOPY OF STRANGE, CHARM AND BOTTOM PARTICLES AT THE TEVATRON.

COLUMBIA UNIVERSITY
FERMILAB
UNIVERSITY OF GUANAJUATO (MEXICO)
UNIVERSITY OF MASSACHUSETTS
TEXAS A&M UNIVERSITY

Request	1 Feb, 81	1,400 Hours including 400 hours of target fragmentation measurements during installation and 1000 hours with full detector
Approval	1 Jul, 81	Unspecified
	12 Nov, 83	Unspecified Stage I approval.
	4 Apr, 87	Unspecified Stage II approval.
	8 Jan, 92	Unspecified
Completed	8 Jan, 92	Unspecified

691 TAGGED PHOTON #691 — **Michael S. Witherell**

BEAM: Proton Area - East
PROPOSAL TO DO PHOTON PHYSICS WITH THE TEVATRON AT THE TAGGED PHOTON SPECTROMETER.

UNIV. OF CALIFORNIA, SANTA BARBARA
CARELTON UNIVERSITY (CANADA)
CBPF (BRAZIL)
UNIVERSITY OF COLORADO AT BOULDER
FERMILAB
NATIONAL RESEARCH COUNCIL (CANADA)
UNIVERSITY OF OKLAHOMA
UNIVERSITY OF SAO PAULO (BRAZIL)
UNIVERSITY OF TORONTO (CANADA)

Request	1 Feb, 81	1,000 Hours
Approval	12 Nov, 83	Unspecified Stage I approval.
Completed	29 Aug, 85	1,400 Hours

700 NEUTRINO OSCILLATION #700 — **David J. Miller**

BEAM: Neutrino Area - Prompt Beam
STUDY OF NEUTRINO OSCILLATIONS AND SEARCH FOR THE TAU NEUTRINO.

UNIVERSITY OF BARI (ITALY)
ECOLE POLYTECH, PALAISEAU (FRANCE)
ILLINOIS INSTITUTE OF TECHNOLOGY
LONDON UNIVERSITY COLLEGE(ENGLAND)
TUFTS UNIVERSITY

Request	10 Feb, 81	2.5 E18th Protons
Inactive	1 Apr, 84	

701 NEUTRINO OSCILLATION #701 — **Michael H. Shaevitz**

BEAM: Neutrino Area - Dichromatic
A SEARCH FOR NEUTRINO OSCILLATIONS WITH DELTA-M-SQUARE GREATER THAN 10 EV-SQUARE.

UNIVERSITY OF CHICAGO
COLUMBIA UNIVERSITY
FERMILAB
UNIVERSITY OF ROCHESTER

Request	12 Feb, 81	5.2 E18th Protons
Approval	1 Jul, 81	Unspecified
Completed	14 Jun, 82	2,250 Hours

702 PARTICLE SEARCH #702 — **George Glass**

BEAM: Internal Target Area (C-0)
SEARCH FOR PARTICLES WITH ANOMALOUS VALUES OF M/Q AND EXTREMELY SHORT INTERACTION LENGTHS (A REVISION OF P-607).
(To use recoil spectrometer with rotating be wire filament target.)

IHEP, BEIJING (PRC)
FERMILAB
NORTHEASTERN UNIVERSITY
TEXAS A&M UNIVERSITY

Request	12 Jun, 81	400 Hours for data and approximately 3 months to build and debug the apparatus
Inactive	1 Apr, 84	

703 ELECTRON TARGET FACILITY #703 — **William R. Frisken**

BEAM: Collision Area (D-0)
ELECTRON-PROTON COLLISIONS AT FERMILAB
(Electron-proton collisions using the canadian high energy electron ring cheer.)

CIPP (CANADA)
CARELTON UNIVERSITY (CANADA)
CEN-SACLAY (FRANCE)
CHALK RIVER NUCLEAR LAB. (CANADA)
CORNELL UNIVERSITY
ENRICO FERMI INSTITUTE
FERMILAB
UNIVERSITY OF MARYLAND
MCGILL UNIVERSITY (CANADA)
NATIONAL RESEARCH COUNCIL (CANADA)
UNIVERSITY OF SASKATCHEWAN(CANADA)
UNIVERSITY OF TORONTO (CANADA)
TRIUMF (CANADA)
YORK UNIVERSITY (CANADA)

Request	6 Jul, 81	1,000 Hours initial run to obtain 1 x 10 to the 4th inverse nanobarns. plus several later runs totalling 10 to the 6th inverse nanobarns
Inactive	23 Jun, 82	

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704 POLARIZED BEAM #704 — **Akihiko Yokosawa**

BEAM: Meson Area - Polarized Proton Beam
INTEGRATED PROPOSAL ON FIRST ROUND EXPERIMENTS WITH THE POLARIZED BEAM FACILITY.

ARGONNE NATIONAL LABORATORY
CEN-SACLAY (FRANCE)
FERMILAB
HIROSHIMA UNIVERSITY (JAPAN)
UNIVERSITY OF IOWA
KYOTO SANGYO UNIVERSITY (JAPAN)
KYOTO UNIVERSITY (JAPAN)
KYOTO UNIV. OF EDUCATION (JAPAN)
LAPP, D'ANNECY-LE-VIEUX (FRANCE)
LOS ALAMOS NATIONAL LABORATORY
NORTHWESTERN UNIVERSITY
UN. OF OCCUP. & ENV. HEALTH(JAPAN)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
RICE UNIVERSITY
UNIVERSITY DI TRIESTE (ITALY)
UNIVERSITY OF UDINE (ITALY)

Request	8 Sep, 81	1,200 Hours	proposal to perform simultaneously substantial parts of experiments described in P676, P678, P674 and P677.
Approval	14 Dec, 81	Unspecified	Stage I approval.
	15 Dec, 83	1,200 Hours	Stage II approval.
Completed	13 Aug, 90	Unspecified	

705 CHI MESON #705 — **Bradley B. Cox**

BEAM: Proton Area - West
A STUDY OF CHARMONIUM AND DIRECT PHOTON PRODUCTION BY 300 GEV/C ANTIPROTON,PROTON,PI+ AND PI- BEAMS.

UNIVERSITY OF SOUTH ALABAMA
UNIVERSITY OF ARIZONA
UNIVERSITY OF ATHENS (GREECE)
DUKE UNIVERSITY
FERMILAB
UNIVERSITY OF FIRENZE (ITALY)
MCGILL UNIVERSITY (CANADA)
NANJING UNIVERSITY (PRC)
NORTHWESTERN UNIVERSITY
PRAIRIE VIEW A&M UNIVERSITY
SHANDONG UNIVERSITY (PRC)
SSC LABORATORY
UNIVERSITY OF VIRGINIA

Request	1 Oct, 81	1,500 Hours	
Approval	14 Dec, 81	1,500 Hours	
Completed	15 Feb, 88	3,600 Hours	

706 DIRECT PHOTON PRODUCTION #706 — **Paul F. Slattery**

BEAM: Meson Area - West
A Comprehensive Study of Direct Photon Production in Hadron Induced Collisions

UNIV. OF CALIFORNIA, DAVIS
DELHI UNIVERSITY (INDIA)
FERMILAB
MICHIGAN STATE UNIVERSITY
NORTHEASTERN UNIVERSITY
UNIVERSITY OF OKLAHOMA
PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY OF PITTSBURGH
UNIVERSITY OF ROCHESTER

Request	26 Oct, 81	2,400 Hours	
Approval	14 Dec, 81	1,000 Hours	
Completed	8 Jan, 92	Unspecified	

707 SIGMA MINUS BETA DECAY #707 — **Peter S. Cooper**

BEAM: Proton Area - Center
MEASUREMENT OF THE ELECTRON ASYMMETRY PARAMETER IN SIGMA MINUS BETA DECAY.

UNIVERSITY OF CHICAGO
FERMILAB
IOWA STATE UNIVERSITY
UNIVERSITY OF IOWA
NPI, ST. PETERSBURG (RUSSIA)
YALE UNIVERSITY

Request	24 Nov, 81	300 Hours	
Rejected	15 Dec, 81		

708 ELECTRON TARGET FACILITY #708 — **Wonyong Lee**

BEAM: Collision Area (D-0)
ELECTRON-PROTON INTERACTION EXPERIMENT
(Supercedes proposal #659.)

ARGONNE NATIONAL LABORATORY
BROOKHAVEN NATIONAL LABORATORY
UNIVERSITY OF CHICAGO
UNIVERSITY OF COLORADO AT BOULDER
COLUMBIA UNIVERSITY
FERMILAB
HARVARD UNIVERSITY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
UNIVERSITY OF MICHIGAN
NIKHEF-H (NETHERLANDS)
UNIVERSITY OF PENNSYLVANIA
PRINCETON UNIVERSITY
ROCKEFELLER UNIVERSITY

Request	25 Nov, 81	Unspecified	
Inactive	23 Jun, 82		

709 FORWARD DETECTOR #709 — **Michael J. Longo**

BEAM: Collision Area (D-0)
PROPOSAL FOR A FORWARD DETECTOR FOR THE D0 AREA

UNIV. OF ILLINOIS, CHICAGO CIRCLE
UNIVERSITY OF MICHIGAN

Request	11 Jan, 82	Unspecified
Rejected	23 Jun, 82	

710 TOTAL CROSS-SECTION #710 — **Jay Orear and Roy Rubinstein**

BEAM: Collision Area (E-0)
MEASUREMENTS OF ELASTIC SCATTERING AND TOTAL CROSS SECTIONS AT THE FERMILAB PBAR-P COLLIDER.

UNIVERSITY OF BOLOGNA (ITALY)
CORNELL UNIVERSITY
FERMILAB
GEORGE MASON UNIVERSITY
UNIVERSITY OF MARYLAND
NORTHWESTERN UNIVERSITY

Request	1 Feb, 82	Unspecified
Approval	23 Jun, 82	Unspecified
Completed	31 May, 89	Unspecified

711 CONSTITUENT SCATTERING #711 — **David A. Levinthal**

BEAM: Neutrino Area - East
A PROPOSAL TO MEASURE THE ENERGY, ANGULAR, AND CHARGE DEPENDENCE OF MASSIVE DI-HADRON PRODUCTION OVER A LARGE SOLID ANGLE IN INTENSE PROTON AND PION BEAMS.

ARGONNE NATIONAL LABORATORY
FERMILAB
FLORIDA STATE UNIVERSITY
UNIVERSITY OF MICHIGAN

Request	28 Aug, 82	Unspecified	
Approval	1 Jul, 83	Unspecified	
Completed	15 Feb, 88	1,400 Hours	

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712 MUON PRODUCTON #712 — **Patrick D. Rapp**
BEAM: Collision Area (D-0)
STUDY OF MUONS FROM PBAR-P COLLISIONS UP TO SQUARE ROOT OF S EQUAL TO 2 TEV.

FERMILAB
GEORGE MASON UNIVERSITY

Request	1 Feb, 82	Unspecified
Rejected	23 Jun, 82	

713 HIGHLY IONIZING PARTICLES #713 — **P. Buford Price**
BEAM: Collision Area (D-0)
PROPOSAL FOR A SEARCH FOR HIGHLY IONIZING PARTICLES FOR THE D0 AREA AT FERMILAB.

UNIV. OF CALIFORNIA, BERKELEY
HARVARD UNIVERSITY

Request	29 Jan, 82	Unspecified
Approval	23 Jun, 82	Unspecified
Completed	31 May, 89	Unspecified

714 LARGE ANGLE PARTICLE #714 — **Paul D. Grannis**
BEAM: Collision Area (D-0)
LARGE ANGLE PARTICLE D0 GROUP

BROOKHAVEN NATIONAL LABORATORY
BROWN UNIVERSITY
COLUMBIA UNIVERSITY
FERMILAB
MICHIGAN STATE UNIVERSITY
SUNY AT STONY BROOK

Request	5 Feb, 82	Unspecified
Rejected	1 Jul, 83	

715 SIGMA BETA DECAY #715 — **Peter S. Cooper**
BEAM: Proton Area - Center
PRECISION MEASUREMENT OF THE DECAY SIGMA MINUS TO NEUTRON AND ELECTRON AND NEUTRINO.

UNIVERSITY OF CHICAGO
ELMHURST COLLEGE
FERMILAB
IOWA STATE UNIVERSITY
UNIVERSITY OF IOWA
NPI, ST. PETERSBURG (RUSSIA)
YALE UNIVERSITY

Request	19 Feb, 82	Unspecified
Approval	23 Jun, 82	Unspecified for 3 months
Completed	14 Feb, 84	820 Hours

716 BEAM DUMP #716 — **Byron P. Roe**
BEAM: Meson Area - M2 Beam
PROPOSAL FOR FURTHER BEAM DUMP NEUTRINO RUNNING

FERMILAB
UNIVERSITY OF FIRENZE (ITALY)
UNIVERSITY OF MICHIGAN
UNIVERSITY OF WISCONSIN-MADISON

Request	9 Feb, 82	Unspecified
Rejected	23 Jun, 82	

717 FORWARD DETECTOR #717 — **Joseph Lach**
BEAM: Collision Area (D-0)
A FORWARD LOOKING DETECTOR FOR THE D0 AREA.

FERMILAB

Request	19 Mar, 82	Unspecified
Rejected	23 Jun, 82	

718 CALORIMETERS AT D-0 #718 — **Albert R. Erwin**
BEAM: Collision Area (D-0)
STUDY OF PBAR-P INTERACTIONS USING CALORIMETERS AT D-0.

ARGONNE NATIONAL LABORATORY
UNIVERSITY OF ARIZONA
FERMILAB
UNIVERSITY OF PENNSYLVANIA
UNIVERSITY OF WISCONSIN-MADISON

Request	1 Apr, 82	Unspecified
Rejected	23 Jun, 82	

719 ELECTRON TARGET FACILITY #719 — **Wonyong Lee**
BEAM: Collision Area (D-0)
ELECTRON-PROTON INTERACTION EXPERIMENT.
(This proposal supercedes proposals #703 and #708.)

ARGONNE NATIONAL LABORATORY
CARELTON UNIVERSITY (CANADA)
CEN-SACLAY (FRANCE)
CHALK RIVER NUCLEAR LAB. (CANADA)
UNIVERSITY OF COLORADO AT BOULDER
COLUMBIA UNIVERSITY
FERMILAB
HARVARD UNIVERSITY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
JOHNS HOPKINS UNIVERSITY
UNIVERSITY OF MARYLAND
MCGILL UNIVERSITY (CANADA)
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF MICHIGAN
NIKHEF-H (NETHERLANDS)
UNIVERSITY OF PENNSYLVANIA
PRINCETON UNIVERSITY
RICE UNIVERSITY
ROCKEFELLER UNIVERSITY
UNIVERSITY OF SASKATCHEWAN(CANADA)
UNIVERSITY OF TORONTO (CANADA)

Request	14 May, 82	Unspecified
Not Approved	23 Jun, 82	

720 FREE QUARK SEARCH #720 — **John P. Schiffer**
BEAM: Miscellaneous Area
PROPOSAL TO SEARCH FOR +1/3E STABLE PARTICLES USING CRYOGENIC SOURCES.

ARGONNE NATIONAL LABORATORY
FERMILAB

Request	29 Jan, 82	Unspecified
Approval	15 Mar, 82	Unspecified for 3 months
	2 Jun, 82	Unspecified
Completed	8 Oct, 82	Unspecified

721 CP VIOLATION #721 — **Jerome L. Rosen**
BEAM: Proton Area - West
AN EXPERIMENT TO STUDY CP VIOLATION IN THE DECAY OF K-LONG PRODUCED BY ANTI-PROTONS.

UNIVERSITY OF ARIZONA
UNIVERSITY OF ATHENS (GREECE)
DUKE UNIVERSITY
FERMILAB
FLORIDA A&M UNIVERSITY
MCGILL UNIVERSITY (CANADA)
NORTHWESTERN UNIVERSITY
SHANDONG UNIVERSITY (PRC)

Request	11 Jun, 82	Unspecified
Approval	12 Mar, 84	Test Running
Approved/Inactive	30 Jun, 87	Unspecified

722 D-0 STREAMER CHAMBER #722 — **V. Paul Kenney**
BEAM: Collision Area (D-0)
STREAMER CHAMBER EXPERIMENT AT THE TEVATRON COLLIDER.

UNIVERSITY OF CAMBRIDGE (ENGLAND)
NOTRE DAME UNIVERSITY

Request	11 Oct, 82	Unspecified
Inactive	18 Feb, 83	

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723 GRAVITATIONAL DETECTOR #723 — **Adrian Melissinos**

FERMILAB
UNIVERSITY OF ROCHESTER

BEAM: Collision Area (C-0)
TEST OF A GRAVITATIONAL DETECTOR AT THE TEVATRON COLLIDER.

Request	21 Oct, 82	Unspecified
Approval	12 Mar, 84	Test Running
Completed	29 Aug, 85	Test Running

724 CALORIMETRIC DETECTOR #724 — **Michael J. Longo**

CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIV. OF ILLINOIS, CHICAGO CIRCLE
MCGILL UNIVERSITY (CANADA)
UNIVERSITY OF MICHIGAN
NOTRE DAME UNIVERSITY

BEAM: Collision Area (D-0)
COMPLETE CALORIMETRIC DETECTOR FOR THE D-0 AREA.

Request	26 Oct, 82	Unspecified
Rejected	1 Jul, 83	

725 DIFFRACTION DISSOCIATION #725 — **Konstantin Goulianos**

ROCKEFELLER UNIVERSITY

BEAM: Collision Area (D-0)
A PROPOSAL TO MEASURE SINGLE AND DOUBLE DIFFRACTION DISSOCIATION AT THE FERMILAB PBAR-P COLLIDER.

Request	1 Nov, 82	Unspecified
Rejected	1 Jul, 83	

726 CALORIMETRIC DETECTOR #726 — **Maris A. Abolins**

UNIVERSITY OF ARIZONA
FERMILAB
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF PENNSYLVANIA

BEAM: Collision Area (D-0)
PROPOSED CALORIMETRIC DETECTOR FOR THE D-0 AREA.

Request	1 Nov, 82	Unspecified
Rejected	1 Jul, 83	

727 FORWARD CALORIMETER #727 — **Jerome L. Rosen**

NORTHWESTERN UNIVERSITY

BEAM: Collision Area (D-0)
SPLIT-FIELD MAGNET SPECTROMETER AND ELECTROMAGNETIC SHOWER DETECTOR FOR D-0.

Request	2 Nov, 82	Unspecified
Withdrawn	16 May, 83	

728 MUON PRODUCTION #728 — **Daniel R. Green**

UNIVERSITY OF ARIZONA
FERMILAB
FLORIDA STATE UNIVERSITY
UNIVERSITY OF MARYLAND
VIRGINIA POLYTECHNIC INSTITUTE

BEAM: Collision Area (D-0)
STUDY OF MUONS FROM PBAR-P COLLISIONS UP TO SQUARE ROOT OF S EQUAL TO 2 TEV.
(This proposal supercedes proposal #712.)

Request	1 Nov, 82	Unspecified
Rejected	1 Jul, 83	

729 EMULSION/PROTONS @ 1 TEV #729 — **Atul Gurtu**

TATA INSTITUTE (INDIA)

BEAM: Meson Area - Test Beam
PROPOSAL TO STUDY CHARM AND MULTIPARTICLE PRODUCTION IN 1 TEV PROTON-EMULSION COLLISIONS

Request	24 Nov, 82	Unspecified
Approval	5 Dec, 83	Emulsion Exposure
Completed	26 Apr, 85	2 Emulsion Stack(s)

730 EMULSION/SIGMA-MINUS @ 250 #730 — **Richard J. Wilkes**

INP, KRAKOW (POLAND)
INST.FOR NUCL. RESEARCH (BULGARIA)
UNIVERSITY OF WASHINGTON

BEAM: Proton Area - Center
EMULSION EXPOSURE TO 250 GEV SIGMA-MINUS.

Request	5 Jan, 83	Unspecified
Approval	10 Feb, 84	Unspecified
Completed	10 Feb, 84	4 Hours

731 CP VIOLATION #731 — **Bruce D. Winstein**

CEN-SACLAY (FRANCE)
UNIVERSITY OF CHICAGO
ELMHURST COLLEGE
FERMILAB
PRINCETON UNIVERSITY

BEAM: Meson Area - Center
A MEASUREMENT OF THE MAGNITUDE OF (E'/E) IN THE NEUTRAL KAON SYSTEM TO A PRECISION OF .001.

Request	1 Feb, 83	Unspecified
Approval	1 Jul, 83	Unspecified
Completed	15 Feb, 88	3,100 Hours

732 XI-ZERO DECAY #732 — **Marleigh C. Sheaff**

UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Proton Area - Center
A SEARCH FOR THE DECAY NEUTRAL CASCADE TO PROTON AND NEGATIVE PION.

Request	1 Feb, 83	Unspecified
Rejected	25 Jun, 85	

733 NEUTRINO INTERACTIONS #733 — **Raymond L. Brock**

FERMILAB
UNIVERSITY OF FLORIDA
MASSACHUSETTS INST. OF TECHNOLOGY
MICHIGAN STATE UNIVERSITY

BEAM: Neutrino Area - Center
PROPOSAL TO STUDY HIGH ENERGY NEUTRINO INTERACTIONS WITH THE TEVATRON QUADRUPOLE TRIPLET BEAM.

Request	1 Feb, 83	Unspecified
	16 Sep, 83	Unspecified
Approval	12 Nov, 83	Unspecified Stage I approval.
Completed	1 Feb, 88	4,100 Hours

734 HYPERON PRODUCTION #734 — **Michael V. Hynes**

UNIV. OF CALIFORNIA, LOS ANGELES
LOS ALAMOS NATIONAL LABORATORY

BEAM: Proton Area - Center
PRIMAKOFF PRODUCTION OF HYPERON EXCITED STATES.

Request	1 Apr, 83	Unspecified
Inactive	21 May, 86	

735 PARTICLE SEARCH #735 — **Laszlo J. Gutay**

DUKE UNIVERSITY
FERMILAB
IOWA STATE UNIVERSITY
NOTRE DAME UNIVERSITY
PURDUE UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Collision Area (C-0)
SEARCH FOR A DECONFINED QUARK GLUON PHASE OF STRONGLY INTERACTING MATTER IN PBAR-P INTERACTIONS AT SQUARE ROOT OF S EQUAL TO 2 TEV.

Request	11 Apr, 83	Unspecified
	16 Sep, 83	Unspecified
Approval	15 Dec, 83	Unspecified Stage I approval.
Completed	31 May, 89	Unspecified

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736 D-0 QUARK SEARCH #736 — **Robert K. Adair**

BEAM: Collision Area (D-0)
A PROPOSAL TO CONDUCT A QUARK SEARCH AT THE FERMILAB COLLIDER.

BROOKHAVEN NATIONAL LABORATORY
YALE UNIVERSITY

Request	11 Apr, 83	Unspecified
Rejected	1 Jul, 83	

737 BATISS EXPERIMENT #737 — **Peter Kotzer**

BEAM: Unspecified Beam
STUDY OF HIGH ENERGY NEUTRINOS WITH A DEEP UNDERWATER DETECTOR OF A MASS GREATER THAN 10 TO THE 6TH TONS.

KAZAKH STATE UNIV., (KAZAKHSTAN)
MOSCOW STATE UNIVERSITY (RUSSIA)
UNIVERSITY OF WASHINGTON
WESTERN WASHINGTON UNIVERSITY

Request	25 Apr, 83	Unspecified
Rejected	12 Nov, 83	

738 NARROW BAND #738 — **Charles Baltay**

BEAM: Neutrino Area - Center
LETTER OF INTENT TO RUN IN THE NARROW BAND AND BEAM AT TEVATRON II.

COLUMBIA UNIVERSITY

Request	3 Jun, 83	Unspecified
Withdrawn	26 Apr, 84	

739 ELECTRON-POSITRON #739 — **Nelson Cue and Chih-Ree Sun**

BEAM: Proton Area - East
MEASUREMENTS OF CRYSTAL-ASSISTED ELECTRON-POSITRON PAIR CREATION.

UNIV. OF CLAUDE BERNARD (FRANCE)
FERMILAB
LAPP, D'ANNECY-LE-VIEUX (FRANCE)
SUNY AT ALBANY

Request	9 Sep, 83	Unspecified
Rejected	19 Apr, 85	

740 D-0 DETECTOR #740 — **Paul D. Grannis**

BEAM: Collision Area (D-0)
STUDY OF PROTON ANTI-PROTON COLLISIONS USING A LARGE DETECTOR AT D-0.

UNIVERSIDAD DE LOS ANDES(COLOMBIA)
UNIVERSITY OF ARIZONA
BROOKHAVEN NATIONAL LABORATORY
BROWN UNIVERSITY
UNIV. OF CALIFORNIA, RIVERSIDE
CBPF (BRAZIL)
CEN-SACLAY (FRANCE)
CINVESTAV-IPN (MEXICO)
COLUMBIA UNIVERSITY
DELHI UNIVERSITY (INDIA)
FERMILAB
FLORIDA STATE UNIVERSITY
UNIVERSITY OF HAWAII AT MANOA
UNIV. OF ILLINOIS, CHICAGO CIRCLE
INDIANA UNIVERSITY
IOWA STATE UNIVERSITY
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF MARYLAND
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF MICHIGAN
MOSCOW STATE UNIVERSITY (RUSSIA)
SUNY AT STONY BROOK
NEW YORK UNIVERSITY
NORTHEASTERN UNIVERSITY
NORTHERN ILLINOIS UNIVERSITY
NORTHWESTERN UNIVERSITY
NOTRE DAME UNIVERSITY
PANJAB UNIVERSITY (INDIA)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
PURDUE UNIVERSITY
RICE UNIVERSITY
UNIVERSITY OF ROCHESTER
SSC LABORATORY
TATA INSTITUTE (INDIA)
TEXAS A&M UNIVERSITY
UNIVERSITY OF TEXAS AT ARLINGTON

Request	9 Sep, 83	Unspecified
Approval	10 Feb, 84	Unspecified
In Progress	31 Oct, 92	Unspecified

741 COLLIDER DETECTOR #741 — **Melvyn Jay Shochet and Alvin V. Tollestrup**

BEAM: Collision Area (B-0)
STUDY OF PROTON ANTI-PROTON COLLISIONS USING A LARGE DETECTOR AT B-0.

ARGONNE NATIONAL LABORATORY
BRANDEIS UNIVERSITY
UNIVERSITY OF CHICAGO
FERMILAB
INFN, FRASCATI (ITALY)
HARVARD UNIVERSITY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
KEK (JAPAN)
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF PENNSYLVANIA
INFN, PISA (ITALY)
PURDUE UNIVERSITY
ROCKEFELLER UNIVERSITY
RUTGERS UNIVERSITY
TEXAS A&M UNIVERSITY
UNIVERSITY OF TSUKUBA (JAPAN)
UNIVERSITY OF WISCONSIN-MADISON

Request	1 Apr, 82	Unspecified
Approval	1 Apr, 82	Unspecified
Completed	31 May, 89	Unspecified

742 STRANGE QUARK #742 — **Joseph Lach**

BEAM: Proton Area - Center
LETTER OF INTENT TO MEASURE OMEGA MINUS POLARIZATION AND MAGNETIC MOMENT.

UNIVERSITY OF CHICAGO
ELMHURST COLLEGE
FERMILAB
IOWA STATE UNIVERSITY
UNIVERSITY OF IOWA
NPI, ST. PETERSBURG (RUSSIA)
YALE UNIVERSITY

Request	13 Jun, 83	Unspecified
Inactive	15 Jun, 85	

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743 CHARM PRODUCTION #743 — **Stephen Reucroft**

BEAM: Meson Area - Test Beam
PROPOSAL TO MEASURE OPEN CHARM PRODUCTION IN PROTON-PROTON COLLISIONS AT 1 TEV WITH LEBC-FMPS.

ITP, AACHEN (GERMANY)
CERN (SWITZERLAND)
CRN, STRASBOURG (FRANCE)
DUKE UNIVERSITY
FERMILAB
FLORIDA STATE UNIVERSITY
IHEP, BERLIN-ZEUTHEN (GERMANY)
UNIVERSITY OF KANSAS
UNIVERSITY OF L'ETAT (BELGIUM)
UNIVERSITY OF LIBRE (BELGIUM)
LPNHE, UN. OF P & M CURIE (FRANCE)
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF MICHIGAN
NORTHEASTERN UNIVERSITY
NOTRE DAME UNIVERSITY
TATA INSTITUTE (INDIA)
VANDERBILT UNIVERSITY
VIENNA INSTITUTE FUR HEP (AUSTRIA)

Request	16 Sep, 83	Unspecified
Approval	16 Dec, 83	Unspecified Stage I approval.
Completed	29 Aug, 85	1,256 K Pix

744 CHARGED INTERACTIONS #744 — **Frank S. Merritt**

BEAM: Neutrino Area - Center
HIGH STATISTICS STUDIES OF CHARGED CURRENT INTERACTIONS USING THE TEVATRON QUAD TRIPLET BEAM.

UNIVERSITY OF CHICAGO
COLUMBIA UNIVERSITY
FERMILAB
UNIVERSITY OF ROCHESTER

Request	16 Sep, 83	Unspecified
Approval	17 Nov, 83	Unspecified Stage I approval.
Completed	29 Aug, 85	1,900 Hours

745 MUON NEUTRINO #745 — **Toshio Kitagaki**

BEAM: Neutrino Area - Center
MUON NEUTRINO EXPERIMENT USING THE TOHOKU HIGH RESOLUTION ONE METER BUBBLE CHAMBER.

IHEP, BEIJING (PRC)
BROWN UNIVERSITY
FERMILAB
INDIANA UNIVERSITY
MASSACHUSETTS INST. OF TECHNOLOGY
NAGOYA UNIVERSITY (JAPAN)
OAK RIDGE NATIONAL LABORATORY
UNIVERSITY OF TENNESSEE, KNOXVILLE
TOHOKU GAKUIN UNIVERSITY (JAPAN)
TOHOKU UNIVERSITY (JAPAN)

Request	10 Sep, 83	Unspecified
Approval	16 Dec, 83	Parasitic Running
Completed	1 Feb, 88	553 K Pix

746 PROMPT BEAM FACILITY #746 — **James K. Walker**

BEAM: Neutrino Area - Prompt Beam
LETTER OF INTENT TO SEARCH FOR NEW PARTICLES FROM THE PROMPT BEAM FACILITY.

FERMILAB
MASSACHUSETTS INST. OF TECHNOLOGY
MICHIGAN STATE UNIVERSITY

Request	1 Sep, 83	Unspecified
Withdrawn	2 Jun, 86	

747 CHARGED PARTICLES #747 — **Alan A. Hahn**

BEAM: Proton Area - Broad Band
A SEARCH FOR FRACTIONALLY CHARGED PARTICLES AT THE TEVATRON.

CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIV. OF CALIFORNIA, IRVINE
FERMILAB
LAWRENCE BERKELEY LABORATORY
LAWRENCE LIVERMORE LABORATORY
LOS ALAMOS NATIONAL LABORATORY
UNIVERSITY OF ROCHESTER
SAN FRANCISCO STATE UNIVERSITY
UNIVERSITY OF TORONTO (CANADA)

Request	27 Feb, 84	Unspecified
Approval	1 Apr, 85	Unspecified
Completed	2 Aug, 85	Unspecified

748 BEAUTY & CHARM PRODUCTION #748 — **Jack Sandweiss**

BEAM: Unspecified Beam
LETTER OF INTENT TO STUDY BEAUTY AND CHARM AT THE TEVATRON USING HIGH RESOLUTION STEAMER CHAMBER AND A DOWNSTREAM SPECTROMETER.

FERMILAB
NEW YORK UNIVERSITY
UNIVERSITY OF VRIJE (BELGIUM)
YALE UNIVERSITY

Request	7 May, 84	Unspecified
Withdrawn	2 Oct, 84	

749 CHANNELING #749 — **James S. Forster**

BEAM: Meson Area - Bottom
LETTER OF INTENT TO STUDY MATERIAL AND FABRICATION ASPECTS OF CRYSTALS USED FOR CHANNELING.

CHALK RIVER NUCLEAR LAB. (CANADA)
FERMILAB
UNIVERSITY OF NEW MEXICO
SUNY AT ALBANY

Request	19 Jul, 84	400 Hours
Withdrawn	1 Oct, 84	

750 MULTIPARTICLE PRODUCTION #750 — **Ram K. Shivpuri**

BEAM: Neutrino Area - Miscellaneous
A PROPOSAL TO STUDY MULTIPARTICLE PRODUCTION IN INTERACTIONS OF 1 TEV PROTONS WITH EMULSION NUCLEI.

DELHI UNIVERSITY (INDIA)

Request	27 Jun, 84	Emulsion Exposure beam at or near 1 TeV protons of flux approximately 5 x 10 to the 4th protons/sq cm over an area of (8 x 3)sq cm
Approval	23 Jul, 84	Emulsion Exposure
Completed	11 Jul, 85	1 Emulsion Stack(s)

751 EMULSION EXPOSURE @ 1 TEV #751 — **Piyare L. Jain**

BEAM: Meson Area - Test Beam
PROPOSAL TO STUDY 1 TEV PROTON INTERACTIONS IN EMULSION.

SUNY AT BUFFALO

Request	27 Jun, 84	Emulsion Exposure
Approval	2 Jul, 84	Emulsion Exposure
Completed	26 Apr, 85	1 Emulsion Stack(s)

752 PARTICLE COLLISIONS #752 — **James W. Cronin**

BEAM: Unspecified Beam
PROPOSAL TO SEARCH FOR ANOMALOUSLY LARGE HADRON CROSS SECTIONS AT SHORT DISTANCES.

UNIVERSITY OF CHICAGO
TECHNION-ISRAEL INST (ISRAEL)

Request	23 Oct, 84	200 Hours
Withdrawn	8 Dec, 86	

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753 CHANNELING STUDIES #753 — James S. Forster

BEAM: Meson Area - Bottom
PROPOSAL TO IMPROVE THE DEFLECTION OF HIGH ENERGY PARTICLE BEAMS BY CHANNELING IN BENT CRYSTALS OF SI AND GE.

BELL NORTHERN RESEARCH LAB(CANADA)
CHALK RIVER NUCLEAR LAB. (CANADA)
FERMILAB
UNIVERSITY OF NEW MEXICO
SUNY AT ALBANY

Request	28 Sep, 84	400 Hours
Approval	20 Nov, 84	Unspecified
Completed	5 Jul, 85	150 Hours

754 CHANNELING TESTS #754 — Chih-Ree Sun

BEAM: Meson Area - Bottom
CRYSTAL CHANNELING TESTS IN M-BOTTOM INCLUDING FOCUSING WITH DEFORMED CRYSTALS AND STUDIES OF HIGH Z CRYSTALS.

FERMILAB
GENERAL ELECTRIC R&D CENTER
SUNY AT ALBANY
SANDIA LABORATORIES
SSC LABORATORY

Request	1 Oct, 84	300 Hours
Approval	20 Nov, 84	Unspecified
Approved/Inactive	24 Dec, 91	

755 BEAUTY & CHARM STUDY #1755 — Richard D. Majka and Anna Jean Slaughter

BEAM: Meson Area - Test Beam
A HIGH SENSITIVITY STUDY OF BEAUTY AND CHARM IN HADROPRODUCTION AT THE TEVATRON.

FERMILAB
YALE UNIVERSITY

Request	2 Oct, 84	Unspecified
Approval	25 Nov, 86	Unspecified
Completed	15 Feb, 88	Unspecified

756 MAGNETIC MOMENT #756 — Kam-Biu Luk

BEAM: Proton Area - Center
MEASUREMENT OF THE MAGNETIC MOMENT OF THE OMEGA MINUS HYPERON.

UNIVERSITY OF ARIZONA
UNIV. OF CALIFORNIA, BERKELEY
FERMILAB
INDIANA UNIVERSITY
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
RUTGERS UNIVERSITY

Request	8 Oct, 84	1,000 Hours
Approval	25 Jun, 85	1,000 Hours Stage I approval.
Completed	15 Feb, 88	1,700 Hours

757 MUON DEFLECTION #757 — Jorge G. Morfin

BEAM: Neutrino Area - Muon Beam
LETTER OF INTENT FOR A PROPOSAL TO STUDY MOMENTUM RESOLUTION FOR MUONS ABOVE 300 GEV IN MAGNETIZED IRON.

FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
UNIVERSITY OF WASHINGTON
UNIVERSITY OF WISCONSIN-MADISON

Request	12 Dec, 84	Test Running
Rejected	14 Dec, 85	

758 EMULSION EXPOSURE #758 — Mitsuko Kazuno and Hiroshi Shibuya

BEAM: Meson Area - Test Beam
STUDY OF THE MECHANISM OF MULTIPARTICLE PRODUCTION IN EMULSION NUCLEI a 800 GEV PROTONS.

NAGOYA UNIVERSITY (JAPAN)
TOHO UNIVERSITY (JAPAN)

Request	11 Mar, 85	Unspecified
Approval	11 Mar, 85	Unspecified
Completed	26 Apr, 85	2 Emulsion Stack(s)

759 EMULSION EXPOSURE #759 — Yoshihiro Tsuzuki

BEAM: Meson Area - Test Beam
A STUDY OF NUCLEAR INTERACTIONS OF 800 GEV PROTONS IN EMULSION.

KOBE UNIVERSITY (JAPAN)
OSAKA CITY UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)

Request	11 Mar, 85	Unspecified
Approval	11 Mar, 85	Unspecified
Completed	26 Apr, 85	2 Emulsion Stack(s)

760 CHARMONIUM STATES #760 — Rosanna Cester

BEAM: Accumulator Ring
A PROPOSAL TO INVESTIGATE THE FORMATION OF CHARMONIUM STATES USING THE PBAR ACCUMULATOR RING.

UNIV. OF CALIFORNIA, IRVINE
FERMILAB
UNIVERSITY OF FERRARA (ITALY)
INFN, GENOVA (ITALY)
NORTHWESTERN UNIVERSITY
PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY OF TORINO (ITALY)

Request	29 Mar, 85	Unspecified
Approval	25 Jun, 85	Unspecified
Completed	10 Jan, 92	Unspecified

761 HYPERON RADIATIVE DECAY #761 — Alexei A. Vorobyov

BEAM: Proton Area - Center
PROPOSAL TO STUDY HYPERON RADIATIVE DECAY.

IHEP, BEIJING (PRC)
UNIVERSITY OF BRISTOL (ENGLAND)
CBPF (BRAZIL)
FERMILAB
UNIVERSITY OF IOWA
ITEP, MOSCOW (RUSSIA)
UNIV. FEDERAL DO RIO DE JANEIRO
UNIVERSITY OF SAO PAULO (BRAZIL)
NPI, ST. PETERSBURG (RUSSIA)
YALE UNIVERSITY

Request	3 Apr, 85	Unspecified
Approval	25 Jun, 85	Unspecified Stage I approval.
Completed	27 Aug, 90	Unspecified

762 EMULSION/PROTONS @ 800 GEV #762 — Shoji Dake

BEAM: Meson Area - Test Beam
CASCADE SHOWERS ORIGINATING IN PROTON-NUCLEUS COLLISIONS.

AOYAMA GAKUIN UNIVERSITY (JAPAN)
ICRR, UNIVERSITY OF TOKYO (JAPAN)
KOBE UNIVERSITY (JAPAN)
OKAYAMA UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)

Request	11 Jun, 85	Unspecified
Approval	21 Jun, 85	Unspecified
Completed	11 Jul, 85	18 Emulsion Stack(s)

763 EMULSION/PROTONS @ 800 GEV #763 — Takeshi Ogata

BEAM: Meson Area - Test Beam
PROTON-NUCLEUS INTERACTIONS AT TEVATRON ENERGY.

ICRR, UNIVERSITY OF TOKYO (JAPAN)
KOBE UNIVERSITY (JAPAN)
OKAYAMA UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)

Request	11 Jun, 85	Unspecified
Approval	21 Jun, 85	Unspecified
Completed	11 Jul, 85	2 Emulsion Stack(s)

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764 EMULSION EXPOSURE #764 — **Hirotada Nanjo**

HIROSAKI UNIVERSITY (JAPAN)

BEAM: Meson Area - Test Beam
EXCLUSIVE INVESTIGATION OF MULTIPLE PRODUCTION IN RAPIDITY SPACE.

Request	11 Jun, 85	Unspecified
Approval	21 Jun, 85	Unspecified
Completed	11 Jul, 85	1 Emulsion Stack(s)

765 EMULSION/PROTONS @ 800 GEV #765 — **K. Imaeda**

OKAYAMA UNIVERSITY (JAPAN)

BEAM: Meson Area - Test Beam
TRANSVERSE MOMENTUM MEASUREMENT OF SECONDARY PARTICLES IN PROTON-EMULSION COLLISIONS AT 800 GEV.

Request	20 Jun, 85	Unspecified
Approval	21 Jun, 85	Unspecified
Completed	11 Jul, 85	7 Emulsion Stack(s)

766 MR TUNNEL NEUTRONS #T766 — **Joseph B. McCaslin**

FERMILAB
LAWRENCE BERKELEY LABORATORY

BEAM: Collision Area (Miscellaneous)
MEASUREMENTS OF THE NEUTRON SPECTRUM IN THE TEVATRON TUNNEL WITH APPLICATION TO THE SSC.

Request	11 Jul, 85	Unspecified
Approval	17 Jul, 85	Unspecified
Completed	13 Oct, 85	Unspecified

767 MUON CALORIMETRY #767 — **Yasushi Muraki**

CHUO UNIVERSITY (JAPAN)
ICRR, UNIVERSITY OF TOKYO (JAPAN)
KEK (JAPAN)
NAGOYA UNIVERSITY (JAPAN)

BEAM: Neutrino Area - Muon Beam
MEASUREMENT OF DIRECT ELECTRON PAIR PRODUCTION CROSS-SECTION IN THE TEVATRON MUON BEAM.

Request	29 Aug, 85	Unspecified
Rejected	1 Jul, 86	

768 POLARIZED SCATTERING #768 — **Alan D. Krisch**

BROOKHAVEN NATIONAL LABORATORY
CERN (SWITZERLAND)
FERMILAB
LHE, ETH HONGGERBERG (SWITZERLAND)
UNIVERSITY OF MARYLAND
MASSACHUSETTS INST. OF TECHNOLOGY
UNIVERSITY OF MICHIGAN
NOTRE DAME UNIVERSITY
TEXAS A&M UNIVERSITY

BEAM: Proton Area - West
PROTON - PROTON ELASTIC SCATTERING WITH A POLARIZED TARGET.

Request	12 Nov, 85	Unspecified
Rejected	30 Jun, 87	

769 PION & KAON CHARM PROD. #769 — **Jeffrey A. Appel**

CBPF (BRAZIL)
FERMILAB
UNIVERSITY OF MISSISSIPPI
NORTHEASTERN UNIVERSITY
UNIVERSITY OF TORONTO (CANADA)
TUFTS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON
YALE UNIVERSITY

BEAM: Proton Area - East
PION AND KAON PRODUCTION OF CHARM AND CHARM-STRANGE STATE.

Request	14 Dec, 85	Unspecified
Approval	14 Dec, 85	Unspecified
Completed	15 Feb, 88	1,900 Hours

770 QUAD TRIPLET NEUTRINO #770 — **Wesley H. Smith**

UNIVERSITY OF CHICAGO
COLUMBIA UNIVERSITY
FERMILAB
UNIVERSITY OF ROCHESTER
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Neutrino Area - Center
HIGH STATISTICS STUDIES OF CHARGED CURRENT INTERACTIONS USING THE TEVATRON QUAD TRIPLET BEAM.

Request	27 Dec, 85	Unspecified
Approval	27 Dec, 85	Unspecified Stage I approval.
Completed	1 Feb, 88	1,600 Hours

771 BEAUTY PRODUCTION BY PROTONS #771 — **Bradley B. Cox**

UNIVERSITY OF SOUTH ALABAMA
UNIVERSITY OF ATHENS (GREECE)
BROWN UNIVERSITY
UNIV. OF CALIFORNIA, BERKELEY
UNIV. OF CALIFORNIA, LOS ANGELES
DUKE UNIVERSITY
FERMILAB
UNIVERSITY OF HOUSTON
JINR, DUBNA (RUSSIA)
UNIVERSITY OF LECCE (ITALY)
MASSACHUSETTS INST. OF TECHNOLOGY
MCGILL UNIVERSITY (CANADA)
NANJING UNIVERSITY (PRC)
NORTHWESTERN UNIVERSITY
UNIVERSITY OF PAVIA (ITALY)
UNIVERSITY OF PENNSYLVANIA
PRAIRIE VIEW A&M UNIVERSITY
SHANDONG UNIVERSITY (PRC)
VANIER COLLEGE (CANADA)
UNIVERSITY OF VIRGINIA
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Proton Area - West
PROPOSAL TO STUDY BEAUTY PRODUCTION AND OTHER HEAVY QUARK PHYSICS ASSOCIATED WITH DIMUON PRODUCTION IN 800 (925) GEV/C PP INTERACTIONS.

Request	10 Dec, 86	Unspecified
Approval	4 Apr, 87	Unspecified
Completed	8 Jan, 92	Unspecified

772 DIMUONS #772 — **Joel M. Moss**

CASE WESTERN RESERVE UNIVERSITY
FERMILAB
UNIV. OF ILLINOIS, CHICAGO CIRCLE
LOS ALAMOS NATIONAL LABORATORY
SUNY AT STONY BROOK
NORTHERN ILLINOIS UNIVERSITY
RUTGERS UNIVERSITY
UNIVERSITY OF SOUTH CAROLINA
UNIVERSITY OF TEXAS AT AUSTIN
UNIVERSITY OF WASHINGTON

BEAM: Meson Area - East
STUDY OF THE NUCLEAR ANTIQUARK SEA VIA P+N -> DIMUONS.

Request	11 Mar, 86	Unspecified
Approval	1 Jul, 86	Unspecified
Completed	15 Feb, 88	1,700 Hours

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773 ETA00 & ETA +- PHASE DIFFERENCE #773 — George D. Gollin

BEAM: Meson Area - Center
MEASUREMENT OF PHASE DIFFERENCE BETWEEN ETA 00 AND ETA +- TO A PRECISION OF 1/2 DEGREE.

UNIVERSITY OF CHICAGO
ELMHURST COLLEGE
FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
RUTGERS UNIVERSITY

Request	11 Mar, 86	Unspecified
Approval	1 Jul, 86	Unspecified
	29 Jun, 89	Unspecified Stage II approval.
Completed	30 Sep, 91	Unspecified

774 ELECTRON BEAM DUMP #774 — Michael B. Crisler

BEAM: Proton Area - Broad Band
ELECTRON BEAM DUMP PARTICLE SEARCH IN THE WIDE BAND HALL.

FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
INP, KRAKOW (POLAND)
NORTHEASTERN UNIVERSITY

Request	4 Apr, 86	Unspecified
Approval	10 Dec, 86	Unspecified
Completed	27 Aug, 90	Unspecified

775 CDF UPGRADE #775 — Melvyn Jay Shochet and William C. Carithers

BEAM: Collision Area (B-0)
CDF UPGRADE (Level-3 Trigger; Silicon Vertex (#775A); and Muon System (#775B))

ARGONNE NATIONAL LABORATORY
UNIVERSITY OF BOLOGNA (ITALY)
BRANDEIS UNIVERSITY
UNIV. OF CALIFORNIA, LOS ANGELES
CIPP (CANADA)
UNIVERSITY OF CHICAGO
DUKE UNIVERSITY
FERMILAB
INFN, FRASCATI (ITALY)
HARVARD UNIVERSITY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
JOHNS HOPKINS UNIVERSITY
KEK (JAPAN)
LAWRENCE BERKELEY LABORATORY
MASSACHUSETTS INST. OF TECHNOLOGY
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF MICHIGAN
UNIVERSITY OF NEW MEXICO
OSAKA CITY UNIVERSITY (JAPAN)
UNIVERSITY OF PADOVA (ITALY)
UNIVERSITY OF PENNSYLVANIA
INFN, PISA (ITALY)
UNIVERSITY OF PITTSBURGH
PURDUE UNIVERSITY
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY
RUTGERS UNIVERSITY
SSC LABORATORY
TEXAS A&M UNIVERSITY
UNIVERSITY OF TSUKUBA (JAPAN)
TUFTS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON
YALE UNIVERSITY

Request	28 May, 86	Unspecified
Approval	1 Jul, 86	Unspecified Phase I approval.
In Progress	31 Oct, 92	Unspecified

776 NUCLEAR CAL. CROSS SECTIONS#776 — Samuel I. Baker

BEAM: Miscellaneous Area
MEASUREMENT OF NUCLEAR CALIBRATION CROSS SECTIONS FOR PROTONS GREATER THAN 400 GEV.

BROOKHAVEN NATIONAL LABORATORY
CERN (SWITZERLAND)
FERMILAB

Request	6 Aug, 86	Unspecified
Approval	7 Jan, 87	Unspecified
Completed	15 Feb, 88	Unspecified

777 MR TUNNEL NEUTRONS #777 — Joseph B. McCaslin

BEAM: Collision Area (Miscellaneous)
NEUTRON FLUX MEASUREMENTS IN THE TEVATRON TUNNEL.

FERMILAB
LAWRENCE BERKELEY LABORATORY
SSC CENTRAL DESIGN GROUP

Request	29 Oct, 86	Unspecified
Approval	7 Jan, 87	Unspecified
Completed	11 May, 87	Unspecified

778 MAGNET APERTURE STUDIES #778 — Rodney E. Gerig and Richard Talman

BEAM: Collision Area (Miscellaneous)
STUDY OF THE SSC MAGNET APERTURE CRITERION.

CERN (SWITZERLAND)
CORNELL UNIVERSITY
FERMILAB
UNIVERSITY OF HOUSTON
SSC CENTRAL DESIGN GROUP
SLAC

Request	18 Oct, 86	Unspecified
Approval	10 Dec, 86	Unspecified
Completed	21 Jan, 91	Unspecified

779 HIGH RATE CALORIMETER STUDY#779 — David Anderson

BEAM: Meson Area - West
PROPOSAL TO BUILD A VERY HIGH RATE CALORIMETER.

FERMILAB

Request	29 Oct, 86	Unspecified
Rejected	10 Dec, 86	

780 CHARM PRODUCTION BY PROTONS#780 — Ronald J. Lipton and Douglas Potter

BEAM: Neutrino Area - East
STUDY OF CHARM PRODUCED BY 850 GEV PROTONS.

UNIV. OF CALIFORNIA, DAVIS
CARNEGIE-MELLON UNIVERSITY
UNIVERSITY OF OKLAHOMA

Request	1 Mar, 87	Unspecified
Rejected	14 Dec, 87	

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781 LARGE-X BARYON SPECTROMETER#781 — **James S. Russ**

BEAM: Proton Area - Center
SEGMENTED LARGE-X BARYON SPECTROMETER (SELEX).

IHEP, BEIJING (PRC)
UNIVERSITY OF BRISTOL (ENGLAND)
CARNEGIE-MELLON UNIVERSITY
CBPF (BRAZIL)
CNPQ (BRAZIL)
FERMILAB
UNIVERSITY OF IOWA
ITEP, MOSCOW (RUSSIA)
UNIVERSITY OF ROCHESTER
UNIVERSITY OF SAO PAULO (BRAZIL)
NPI, ST. PETERSBURG (RUSSIA)
UNIVERSITY OF TEL-AVIV (ISRAEL)
UNIVERSITY OF WASHINGTON

Request	4 Mar, 87	Unspecified	
Approval	24 Oct, 88	Unspecified	
Unscheduled	24 Oct, 88		

782 MUONS IN 1M BUBBLE CHAMBER #782 — **Toshio Kitagaki**

BEAM: Neutrino Area - NK Beam
A MUON EXPOSURE IN THE TOHOKU HIGH RESOLUTION BUBBLE CHAMBER.

IHEP, BEIJING (PRC)
BROWN UNIVERSITY
FERMILAB
MASSACHUSETTS INST. OF TECHNOLOGY
OAK RIDGE NATIONAL LABORATORY
SENSYU UNIVERSITY (JAPAN)
SUGIYAMA JOGAKUEN UNIV. (JAPAN)
UNIVERSITY OF TENNESSEE, KNOXVILLE
TOHOKU GAKUIN UNIVERSITY (JAPAN)
TOHOKU UNIVERSITY (JAPAN)

Request	4 Feb, 87	Unspecified	
Approval	16 Jul, 87	Unspecified	
Completed	21 Jul, 90	330 K Pix	

783 TEVATRON BEAUTY FACTORY #783 — **Neville W. Reay**

BEAM: Collision Area (C-0)
LETTER OF INTENT FOR A TEVATRON COLLIDER BEAUTY FACTORY.

UNIV. OF CALIFORNIA, DAVIS
CARNEGIE-MELLON UNIVERSITY
FERMILAB
OHIO STATE UNIVERSITY
UNIVERSITY OF OKLAHOMA

Request	4 Mar, 87	Unspecified	
Inactive	23 Dec, 92		

784 BOTTOM AT THE COLLIDER #784 — **Nigel S. Lockyer**

BEAM: Unspecified Beam
PROPOSAL FOR RESEARCH & DEVELOPMENT: VERTEXING, TRACKING AND DATA ACQUISITION FOR THE BOTTOM COLLIDER DETECTOR.

UNIVERSIDAD DE LOS ANDES(COLOMBIA)
UNIV. OF CALIFORNIA, DAVIS
FERMILAB
UNIVERSITY OF FLORIDA
UNIVERSITY OF HOUSTON
ILLINOIS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF IOWA
NORTHEASTERN UNIVERSITY
NORTHERN ILLINOIS UNIVERSITY
OHIO STATE UNIVERSITY
UNIVERSITY OF OKLAHOMA
UNIVERSITY OF PENNSYLVANIA
PRAIRIE VIEW A&M UNIVERSITY
PRINCETON UNIVERSITY
UNIVERSITY OF PUERTO RICO
UN.SAN FRANCISCO DE QUITO(ECUADOR)
YALE UNIVERSITY

Request	2 Jan, 89	Unspecified	
Approval	30 Jan, 89	Unspecified	Approval of Phase I (bench tests) and Phase II (beam tests). Phase III (CO run at the Tevatron Collider) deferred pending results of simulation studies.
Completed	8 Jan, 92	Unspecified	

785 LOW ENERGY ANTIMATTER #785 — **Billy Bonner and Lawrence Pinsky**

BEAM: Miscellaneous Area
ANTIMATTER PHYSICS AT LOW ENERGY (AMPLE)

UNIVERSITY OF HOUSTON
RICE UNIVERSITY

Request	12 Mar, 87	Unspecified	
Withdrawn	24 Oct, 88		

786 TEVATRON MUON #786 — **Richard Wilson**

BEAM: Neutrino Area - Muon Beam
WEAK INTERACTIONS AND HEAVY QUARK PHYSICS WITH THE TEVATRON MUON BEAM.

ARGONNE NATIONAL LABORATORY
UNIV. OF CALIFORNIA, SAN DIEGO
FERMILAB
FREIBURG UNIVERSITY (GERMANY)
HARVARD UNIVERSITY
UNIV. OF ILLINOIS, CHICAGO CIRCLE
INP, KRAKOW (POLAND)
UNIVERSITY OF MARYLAND
MASSACHUSETTS INST. OF TECHNOLOGY
MAX-PLANCK INSTITUTE (GERMANY)
UNIVERSITY OF WASHINGTON
UNIVERSITY OF WUPPERTAL (GERMANY)
YALE UNIVERSITY

Request	10 May, 87	Unspecified	
Rejected	29 Jun, 88		

787 PARTICLE SEARCH #787 — **Alfred T. Goshaw**

BEAM: Collision Area (C-0)
PARTICLE SEARCH (PHASE II OF E-735).

DEPAUW UNIVERSITY
DUKE UNIVERSITY
FERMILAB
IOWA STATE UNIVERSITY
NOTRE DAME UNIVERSITY
PURDUE UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

Request	30 Jun, 87	Unspecified	
Rejected	1 May, 89		

788 NEUTRINO OSCILLATIONS #788 — **Robert H. Bernstein**

BEAM: Neutrino Area - Center
NEUTRINO OSCILLATIONS AND CROSS-SECTIONS IN A TAGGED NEUTRINO LINE.

FERMILAB
UNIV. OF PARIS VI, LPG (FRANCE)

Request	11 Aug, 87	Unspecified	
Inactive	23 Dec, 92		

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789 B-QUARK MESONS & BARYONS #789 — Daniel M. Kaplan and Jen-Chieh Peng

BEAM: Meson Area - East
MEASUREMENT OF THE PRODUCTION AND DECAY INTO TWO-BODY MODES OF B-QUARK MESONS AND BARYONS.

ABILENE CHRISTIAN UNIVERSITY
IHEP, ACADEMIA SINICA (TAIWAN)
UNIVERSITY OF CHICAGO
FERMILAB
LAWRENCE BERKELEY LABORATORY
LOS ALAMOS NATIONAL LABORATORY
NORTHERN ILLINOIS UNIVERSITY
UNIVERSITY OF SOUTH CAROLINA

Request	9 Nov, 87	Unspecified
Approval	24 Oct, 88	Unspecified
Completed	8 Jan, 92	Unspecified

790 CALORIMETER FOR ZEUS #790 — Frank Sciulli

BEAM: Neutrino Area - Test Beam
CALORIMETER MODULE CALIBRATION FOR ZEUS DETECTOR.

ARGONNE NATIONAL LABORATORY
COLUMBIA UNIVERSITY
UNIVERSITY OF IOWA
LOUISIANA STATE UNIVERSITY
OHIO STATE UNIVERSITY
PENNSYLVANIA STATE UNIVERSITY
VIRGINIA POLYTECHNIC INSTITUTE
UNIVERSITY OF WISCONSIN-MADISON

Request	5 Jun, 87	Unspecified
Approval	17 Dec, 87	Unspecified
Completed	27 Aug, 90	Unspecified

791 HADROPRODUCTION HEAVY FLAVORS #791 — Jeffrey A. Appel and Milind Vasant Purohit

BEAM: Proton Area - East
HADROPRODUCTION OF HEAVY FLAVORS AT TPL.

UNIV. OF CALIFORNIA, SANTA CRUZ
CBPF (BRAZIL)
UNIVERSITY OF CINCINNATI
FERMILAB
ILLINOIS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF MISSISSIPPI
OHIO STATE UNIVERSITY
PRINCETON UNIVERSITY
UNIV. FEDERAL DO RIO DE JANEIRO
UNIVERSITY OF TEL-AVIV (ISRAEL)
TUFTS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON
YALE UNIVERSITY

Request	10 Nov, 87	Unspecified
Approval	29 Jun, 88	Unspecified
Completed	8 Jan, 92	Unspecified

792 NUCLEAR FRAGMENTS #792 — Kjell Aleklett and Lembit Sihver

BEAM: Meson Area - East
STUDY OF FRAGMENTATION PRODUCTS FROM THE REACTION 800 GEV P + 197 AU.

LAL, ORSAY (FRANCE)
UPPSALA UNIVERSITY (SWEDEN)

Request	15 Jan, 88	Unspecified
Approval	15 Jan, 88	Unspecified
Completed	15 Feb, 88	Unspecified

793 EMULSION EXPOSURE 1000 GeV #793 — Jere J. Lord

BEAM: Proton Area - Miscellaneous
Emulsion Exposure to 1000 GeV, or highest energy protons.

KAZAKH STATE UNIV., (KAZAKHSTAN)
WASHINGTON NATURAL PHILOSOPHY INS.
UNIVERSITY OF WASHINGTON

Request	19 Feb, 88	Unspecified
Approval	21 Sep, 88	Unspecified
Unscheduled	8 Jan, 92	

794 AXION HELIOSCOPE #794 — Karl Van Bibber

BEAM: Unspecified Beam
CONSTRUCTION AND OPERATION OF AN AXION HELIOSCOPE.

UNIV. OF CALIFORNIA, BERKELEY
CERN (SWITZERLAND)
LAWRENCE BERKELEY LABORATORY
LAWRENCE LIVERMORE LABORATORY
OHIO STATE UNIVERSITY
TEXAS A&M UNIVERSITY
TEXAS ACCELERATOR CENTER

Request	5 Mar, 88	Unspecified
Inactive	23 Dec, 92	

795 WARM LIQUID CALORIMETRY TEST #795 — Morris Pripstein

BEAM: Meson Area - Test Beam
TEST OF ELECTRON/HADRON COMPENSATION FOR WARM LIQUID CALORIMETRY.

UNIVERSITY OF ALABAMA
UNIV. OF CALIFORNIA, BERKELEY
CEN-SACLAY (FRANCE)
CERN (SWITZERLAND)
FERMILAB
COLLEGE DE FRANCE (FRANCE)
HARVARD UNIVERSITY
KYOTO UNIVERSITY (JAPAN)
LAPP, D'ANNECY-LE-VIEUX (FRANCE)
LAWRENCE BERKELEY LABORATORY

Request	1 Mar, 88	Unspecified
Approval	24 Oct, 88	Unspecified
Completed	23 Dec, 91	Unspecified

796 CP VIOLATION #796 — Gordon B. Thomson

BEAM: Proton Area - Center
A MEASUREMENT OF THE CP VIOLATION PARAMETER N+-0 THE SON OF E621.

UNIVERSITY OF MINNESOTA
RUTGERS UNIVERSITY

Request	1 Jun, 88	Unspecified
Unconsidered	1 Jun, 88	

797 FINE-GRAINED ELECTROMAG. CAL. #T797 — H. Richard Gustafson and Rudolf P. Thun

BEAM: Proton Area - East
FINE-GRAINED ELECTROMAGNETIC CALORIMETRY.

UNIVERSITY OF MICHIGAN

Request	31 Aug, 88	Unspecified
Approval	1 Apr, 90	Unspecified
Completed	20 May, 90	Unspecified

798 SSC DETECTOR TEST #T798 — Priscilla Cushman and Roger W. Rusack

BEAM: Proton Area - East
PROPOSAL TO BUILD A SYNCHROTRON-RADIATION DETECTOR FOR TAGGING ELECTRONS AT THE SSC.

ROCKEFELLER UNIVERSITY
YALE UNIVERSITY

Request	20 Jul, 88	Unspecified
Approval	30 Jan, 89	Unspecified Stage I approval.
Completed	2 May, 90	Unspecified

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799 CP VIOLATION #799 — Yau Wai Wah and Taku Yamanaka

BEAM: Meson Area - Center
PROPOSAL TO SEARCH FOR RARE KAON DECAY.

UNIV. OF CALIFORNIA, LOS ANGELES
UNIVERSITY OF CHICAGO
ELMHURST COLLEGE
FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
RUTGERS UNIVERSITY

Request	2 Jan, 89	Unspecified
Approval	29 Jun, 89	Unspecified Stage I approval for phases 1 and 2.
	10 Jul, 91	Unspecified Stage II approval deferred.
In Progress	8 Jan, 92	Unspecified

800 MAGNETIC MOMENT #800 — Kenneth A. Johns and Regina A. Rameika

BEAM: Proton Area - Center
MEASUREMENT OF THE MAGNETIC MOMENT OF THE OMEGA MINUS HYPERON.

UNIVERSITY OF ARIZONA
DEPAUW UNIVERSITY
FERMILAB
UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA

Request	1 Mar, 88	Unspecified
Approval	5 Oct, 88	Unspecified
Completed	8 Jan, 92	Unspecified

801 PHOTON TOTAL XSECTION-URANIUM #801 — G. L. Bayatian

BEAM: Proton Area - Broad Band
MEASUREMENT OF THE TOTAL CROSS SECTION OF REAL AND VIRTUAL PHOTON ABSORBTION ON URANIUM NUCLEI AT ENERGIES OF HUNDREDS OF GEV.

YEREVAN PHYSICS INST. (ARMENIA)

Request	10 Oct, 88	Unspecified
Rejected	26 Dec, 89	

802 MUONS IN EMULSION #802 — Lali Chatterjee and Dipak Ghosh

BEAM: Neutrino Area - Muon Beam
DEEP INELASTIC MUON INTERACTION WITH NUCLEAR TARGETS USING EMULSION TELESCOPE TECHNIQUE.

FERMILAB
JADAVPUR UNIVERSITY (INDIA)

Request	12 Dec, 88	Emulsion Stack(s)
Approval	8 Feb, 89	Emulsion Stack(s) 1st stage approval - exposure of stacks of G5 nuclear emulsion plates to the main muon beam.
Completed	30 Dec, 91	Unspecified

803 NEUTRINO OSCILLATIONS #803 — Neville W. Reay

BEAM: Main Injector Area
Muon Neutrino to Tau Neutrino Oscillations

AICHI UNIV. OF EDUCATION (JAPAN)
UNIVERSITY OF ATHENS (GREECE)
UNIV. OF CALIFORNIA, DAVIS
COLUMBIA UNIVERSITY
FERMILAB
GIFU UNIVERSITY (JAPAN)
HIROSAKI UNIVERSITY (JAPAN)
KINKI UNIVERSITY (JAPAN)
KOBE UNIVERSITY (JAPAN)
KOREA ADV. INST OF SCIENCE (KOREA)
KOREA UNIVERSITY, SEOUL (KOREA)
NAGOYA INST. OF TECHNOLOGY (JAPAN)
NAGOYA UNIVERSITY (JAPAN)
OHIO STATE UNIVERSITY
OKAYAMA UNIVERSITY (JAPAN)
OSAKA CITY UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)
OSAKA UNIV. OF COMMERCE (JAPAN)
ROCKEFELLER UNIVERSITY
SEOUL NATIONAL UNIVERSITY (KOREA)
SOAI UNIVERSITY (JAPAN)
UNIVERSITY OF SOUTH CAROLINA
TOHO UNIVERSITY (JAPAN)
TUFTS UNIVERSITY
UTSUNOMIYA UNIVERSITY (JAPAN)
YOKOHAMA NATIONAL UNIV. (JAPAN)

Request	6 Apr, 89	Unspecified
Deferred	10 Jul, 91	

804 KAON PHYSICS AT MAIN INJECTOR #804 — Bruce D. Winstein

BEAM: Main Injector Area
HIGH PRECISION, HIGH SENSITIVITY KAON PHYSICS AT THE MAIN INJECTOR

UNIV. OF CALIFORNIA, IRVINE
CEN-SACLAY (FRANCE)
UNIVERSITY OF CHICAGO
FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
RUTGERS UNIVERSITY
YALE UNIVERSITY

Request	14 Jun, 88	Unspecified
Unconsidered	14 Jun, 88	

805 IMB NEUTRINO OSCILLATIONS #805 — Wojciech Gajewski

BEAM: Main Injector Area
Long Baseline Oscillation Experiment using a High Intensity Neutrino Beam from the Fermilab Main Injector to the IMB Water Cerenkov Detector

BOSTON UNIVERSITY
BROOKHAVEN NATIONAL LABORATORY
UNIV. OF CALIFORNIA, IRVINE
CLEVELAND STATE UNIVERSITY
UNIVERSITY OF HAWAII AT MANOA
LONDON UNIVERSITY COLLEGE(ENGLAND)
LOUISIANA STATE UNIVERSITY
UNIVERSITY OF MARYLAND
NOTRE DAME UNIVERSITY
WARSAW UNIVERSITY, INP, (POLAND)

Request	24 Aug, 89	Unspecified
Inactive	23 Dec, 92	

Fermi National Accelerator Laboratory
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806 MP BEAMLINE UPGRADE #806 — **Akihiko Yokosawa**

BEAM: Meson Area - Polarized Proton Beam
ENERGY UPGRADE OF THE MP BEAMLINE AND PROPOSED EXPERIMENTS

ARGONNE NATIONAL LABORATORY
CEN-SACLAY (FRANCE)
FERMILAB
HIROSHIMA UNIVERSITY (JAPAN)
UNIVERSITY OF IOWA
KEK (JAPAN)
KYOTO SANGYO UNIVERSITY (JAPAN)
KYOTO UNIVERSITY (JAPAN)
KYOTO UNIV. OF EDUCATION (JAPAN)
LAPP, D'ANNECY-LE-VIEUX (FRANCE)
LOS ALAMOS NATIONAL LABORATORY
NORTHEASTERN UNIVERSITY
NORTHWESTERN UNIVERSITY
UN. OF OCCUP. & ENV. HEALTH(JAPAN)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
RICE UNIVERSITY
UNIVERSITY DI TRIESTE (ITALY)
UNIVERSITY OF UDINE (ITALY)

Request	28 Sep, 89	Unspecified
Withdrawn	7 Mar, 90	

807 WARM HEAVY LIQUID CALORIMETRY #T807 — **Scott Teige**

BEAM: Proton Area - East
WARM HEAVY LIQUID CALORIMETRY: A PROPOSAL TO MEASURE PERFORMANCE OF CANDIDATE MATERIALS

RUTGERS UNIVERSITY

Request	26 Dec, 89	Unspecified
Approval	9 Feb, 90	Unspecified
Completed	1 May, 90	Unspecified

808 B-PHYSICS #T808 — **Howard S. Goldberg**

BEAM: Meson Area - West
B-MESON HADROPRODUCTION, INCLUDING MEASUREMENTS OF CROSS-SECTIONS, LIFETIMES, AND MIXING.

UNIV. OF ILLINOIS, CHICAGO CIRCLE
UNIVERSITY OF LOUISVILLE
UNIVERSITY OF MICHIGAN
UNIVERSITY OF PITTSBURGH
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)

Request	1 Mar, 90	Unspecified
Inactive	23 Dec, 92	

809 DIRECT PHOTON SPIN DEPENDENCE #809 — **Akira Masaike and Sandibek B. Nurushev**

BEAM: Meson Area - Polarized Proton Beam
STUDY OF THE SPIN DEPENDENCE OF DIRECT-GAMMA PRODUCTION AT HIGH P

ARGONNE NATIONAL LABORATORY
CEN-SACLAY (FRANCE)
FERMILAB
UNIVERSITY OF IOWA
KEK (JAPAN)
KYOTO SANGYO UNIVERSITY (JAPAN)
KYOTO UNIVERSITY (JAPAN)
KYOTO UNIV. OF EDUCATION (JAPAN)
LAPP, D'ANNECY-LE-VIEUX (FRANCE)
LOS ALAMOS NATIONAL LABORATORY
INFN, MESSINA (ITALY)
NEW MEXICO STATE UNIVERSITY
NORTHWESTERN UNIVERSITY
OKAYAMA UNIVERSITY (JAPAN)
OSAKA CITY UNIVERSITY (JAPAN)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
RICE UNIVERSITY
UNIVERSITY DI TRIESTE (ITALY)
UNIVERSITY OF UDINE (ITALY)

Request	7 Mar, 90	Unspecified
Inactive	23 Dec, 92	

810 STRUCTURE FUNCTIONS #810 — **Richard Wilson**

BEAM: Neutrino Area - Muon Beam
MEASUREMENT OF NUCLEON STRUCTURE FUNCTIONS WITH HIGH STATISTICAL ACCURACY AND LOW SYSTEMATIC ERRORS. USING MUON BEAMS FROM THE TEVATRON.

UNIV. OF CALIFORNIA, SAN DIEGO
FERMILAB
HARVARD UNIVERSITY
UNIV. OF ILLINOIS, CHICAGO CIRCLE
UNIVERSITY OF WUPPERTAL (GERMANY)

Request	5 Mar, 90	Unspecified
Inactive	23 Dec, 92	

811 PBAR P ELASTIC SCATTERING #811 — **Jay Orear**

BEAM: Collision Area (E-0)
PBAR P ELASTIC SCATTERING.

UNIVERSITY OF BOLOGNA (ITALY)
CERN (SWITZERLAND)
CORNELL UNIVERSITY
FERMILAB
WORLD LAB, LAUSANNE (SWITZERLAND)

Request	14 Mar, 90	Unspecified
Approval	9 Jul, 92	Unspecified
Set Up in a Year	9 Jul, 92	

812 CPT AND GRAVITY TESTS #812 — **Gerald A. Smith**

BEAM: Accumulator Ring
PRECISION TESTS OF CPT AND GRAVITY USING LOW ENERGY ANTIMATTER AT FERMILAB.

UNIV. OF CALIFORNIA, IRVINE
GSI, DARMSTADT (GERMANY)
FERMILAB
INTEGRATED ACCELERATOR TECHNOLOGY
UNIVERSITY OF IOWA
LOS ALAMOS NATIONAL LABORATORY
MANNE SIEGBAHN INSTITUTE (SWEDEN)
MAX-PLANCK INSTITUTE (GERMANY)
UNIVERSITY OF MICHIGAN
UNIVERSITY OF NEW MEXICO
PENNSYLVANIA STATE UNIVERSITY
RUTGERS UNIVERSITY
UNIVERSITY DI TRIESTE (ITALY)

Request	19 Feb, 90	Unspecified
Unconsidered	19 Feb, 90	

813 SMALL PHYSICS #813 — **Lawrence W. Jones**

BEAM: Unspecified Beam
I. A QUANTITATIVE TEST OF THE LANDAU-MIGDAL-POMMERANCHUK EFFECT; II. HADRON INCLUSIVE DISTRIBUTIONS AT HIGH X; III. NEUTRON POLARIZATION

UNIVERSITY OF HAWAII AT MANOA
LODZ UNIVERSITY
UNIVERSITY OF MICHIGAN
UNIVERSITY OF WASHINGTON

Request	2 Mar, 90	Unspecified
Unconsidered	2 Mar, 90	

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814 PRIMAKOFF PRODUCTION #814 — **Vladimir Chaloupka**

BEAM: Proton Area - Center
SEARCH FOR PRIMAKOFF PRODUCTION OF HYBRID MESONS.

UNIVERSITY OF ROCHESTER
UNIVERSITY OF WASHINGTON

Request	28 Feb, 90	Unspecified
Inactive	23 Dec, 92	

815 NEUTRINO #815 — **Michael H. Shaevitz**

BEAM: Neutrino Area - Center
Precision Measurements of Neutrino Neutral Current Interactions Using a Sign-Selected Beam

ADELPHI UNIVERSITY
UNIVERSITY OF CINCINNATI
COLUMBIA UNIVERSITY
FERMILAB
MASSACHUSETTS INST. OF TECHNOLOGY

Request	7 Mar, 90	Unspecified
	9 Oct, 90	Unspecified
Approval	10 Jul, 91	Unspecified Stage I approval for Phase I granted.
	9 Jul, 92	Unspecified Stage I approval for 10 E18th Protons on target
Unscheduled	9 Jul, 92	

816 SDC DETECTOR MUON BEAM TESTS #T816 — **Henry J. Lubatti**

BEAM: Neutrino Area - Muon Beam
SSC Detector Muon Sub-System Beam Tests

UNIVERSITY OF COLORADO AT BOULDER
FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
UNIVERSITY OF MARYLAND
OSAKA CITY UNIVERSITY (JAPAN)
UNIVERSITY OF ROCHESTER
TEMPLE UNIVERSITY
TUFTS UNIVERSITY
UNIVERSITY OF WASHINGTON
UNIVERSITY OF WISCONSIN-MADISON

Request	1 May, 90	Unspecified
Approval	30 Oct, 90	Unspecified
Completed	8 Jan, 92	Unspecified

817 SILICON STRIP DETECTOR TEST #817 — **James P. Alexander**

BEAM: Neutrino Area - Muon Beam
Double-sided silicon strip detector prototype evaluation.

UNIV. OF CALIFORNIA, SANTA BARBARA
CORNELL UNIVERSITY

Request	1 May, 90	Unspecified
Approval	9 Jul, 90	Unspecified
Completed	15 Aug, 90	Unspecified

818 LEAD GLASS DETECTOR TEST #818 — **Scott Teige**

BEAM: Unspecified Beam
Proposal to use the NWA Electron Test Beam at Fermilab for Tests of a Lead Glass Calorimeter Prototype

INDIANA UNIVERSITY
UNIVERSITY OF LOUISVILLE
MOSCOW STATE UNIVERSITY (RUSSIA)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)

Request	26 Jun, 90	Unspecified
Withdrawn	30 Apr, 91	

819 EMPACT DETECTOR TEST FOR SSC #819 — **Louis S. Osborne**

BEAM: Neutrino Area - Muon Beam
EMPACT Muon Telescope Evaluation at Fermilab

UNIVERSITY OF HOUSTON
INDIANA UNIVERSITY
JINR, DUBNA (RUSSIA)
MASSACHUSETTS INST. OF TECHNOLOGY

Request	28 Jun, 90	Unspecified
Approval	15 Aug, 91	Unspecified
Completed	15 Oct, 91	Unspecified

820 MUON NEUTRINO MAGNETIC MOMENT #820 — **Nikos Giokaris**

BEAM: Miscellaneous Area
Search for the muon neutrino magnetic moment at the 10 to the -10 Bohr magneton level using the Booster at Fermilab

FERMILAB
UNIVERSITY OF MARYLAND
NORTHEASTERN UNIVERSITY
NORTHERN ILLINOIS UNIVERSITY
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY

Request	13 Jul, 90	Unspecified
Unconsidered	13 Jul, 90	

821 NEUTRON MEASUREMENTS AT NWA #T821 — **Kenneth A. Johns**

BEAM: Neutrino Area - West
Neutron Measurements at NWA

UNIVERSITY OF ARIZONA
BALL STATE UNIVERSITY
FERMILAB
UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
NORTHERN ILLINOIS UNIVERSITY
RICE UNIVERSITY

Request	14 Aug, 90	Unspecified
Approval	14 Aug, 90	Unspecified
Completed	8 Jan, 92	Unspecified

822 SOUDAN NEUTRINO OSCILLATIONS #822 — **Maury C. Goodman**

BEAM: Main Injector Area
A Long Baseline Neutrino Oscillation Experiment Using Soudan 2

ARGONNE NATIONAL LABORATORY
UNIVERSITY OF ARIZONA
FERMILAB
UNIVERSITY OF MINNESOTA
NOTRE DAME UNIVERSITY
UNIVERSITY OF OXFORD (ENGLAND)
RUTHERFORD-APPLETON LABS.(ENGLAND)
TUFTS UNIVERSITY
UNIVERSITY OF VALENCIA (SPAIN)

Request	24 Aug, 90	Unspecified
Unconsidered	19 Mar, 91	

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823 D-0 DETECTOR UPGRADE #823 — **Paul D. Grannis**

BEAM: Collision Area (D-0)
D0 Detector Upgrade

UNIVERSIDAD DE LOS ANDES(COLOMBIA)
UNIVERSITY OF ARIZONA
BROOKHAVEN NATIONAL LABORATORY
BROWN UNIVERSITY
UNIV. OF CALIFORNIA, RIVERSIDE
CBPF (BRAZIL)
CEN-SACLAY (FRANCE)
CINVESTAV-IPN (MEXICO)
COLUMBIA UNIVERSITY
DELHI UNIVERSITY (INDIA)
FERMILAB
FLORIDA STATE UNIVERSITY
UNIVERSITY OF HAWAII AT MANOA
UNIV. OF ILLINOIS, CHICAGO CIRCLE
INDIANA UNIVERSITY
IOWA STATE UNIVERSITY
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF MARYLAND
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF MICHIGAN
MOSCOW STATE UNIVERSITY (RUSSIA)
SUNY AT STONY BROOK
NEW YORK UNIVERSITY
NORTHEASTERN UNIVERSITY
NORTHERN ILLINOIS UNIVERSITY
NORTHWESTERN UNIVERSITY
NOTRE DAME UNIVERSITY
PANJAB UNIVERSITY (INDIA)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
PURDUE UNIVERSITY
RICE UNIVERSITY
UNIVERSITY OF ROCHESTER
SSC LABORATORY
TATA INSTITUTE (INDIA)
TEXAS A&M UNIVERSITY
UNIVERSITY OF TEXAS AT ARLINGTON

Request	4 Oct, 90	Unspecified	
Approval	11 Jul, 91	Unspecified	Stage I / Step 1 approval granted. Stage I / Step 2 and 3 approval deferred.
Unscheduled	11 Jul, 91		

824 DUMAND NEUTRINO OSCILLATIONS #824 — **Medford Webster**

BEAM: Main Injector Area
Neutrino Beam from the Proposed Main Injector to the DUMAND Detector

RWTH, AACHEN (GERMANY)
UNIVERSITY OF BERNE (SWITZERLAND)
BOSTON UNIVERSITY
UNIVERSITY OF HAWAII AT MANOA
ICRR, UNIVERSITY OF TOKYO (JAPAN)
UNIVERSITY OF KIEL (GERMANY)
KINKI UNIVERSITY (JAPAN)
KOBE UNIVERSITY (JAPAN)
SCRIPPS INST. OF OCEANOGRAPHY/UCSD
TOHOKU UNIVERSITY (JAPAN)
VANDERBILT UNIVERSITY
UNIVERSITY OF WASHINGTON
UNIVERSITY OF WISCONSIN-MADISON

Request	4 Oct, 90	Unspecified
Inactive	23 Dec, 92	

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825 SDC PROTOTYPE DETECTORS #825 — **J. Bensinger**

BEAM: Unspecified Beam

Testing of Prototype Detectors for the Solenoidal Detector Collaboration

ARGONNE NATIONAL LABORATORY
UNIVERSITY OF ARIZONA
BRANDEIS UNIVERSITY
BRATSLAVA STATE UNIVERSITY (CZECH)
UNIVERSITY OF BRISTOL (ENGLAND)
BROWN UNIVERSITY
UNIV. OF CALIFORNIA, DAVIS
UNIV. OF CALIFORNIA, LOS ANGELES
UNIV. OF CALIFORNIA, RIVERSIDE
UNIV. OF CALIFORNIA, SAN DIEGO
UNIV. OF CALIFORNIA, SANTA CRUZ
CHIBA UNIVERSITY (JAPAN)
UNIVERSITY OF CHICAGO
UNIVERSITY OF COLORADO AT BOULDER
DUKE UNIVERSITY
FERMILAB
FLORIDA STATE UNIVERSITY
UNIVERSITY OF FLORIDA
FUKUI UNIVERSITY (JAPAN)
GOMEL STATE UNIVERSITY (BYELARUS)
HARVARD UNIVERSITY
UNIVERSITY OF HAWAII AT MANOA
HIROSHIMA INST. OF TECH. (JAPAN)
HIROSHIMA UNIVERSITY (JAPAN)
IBARAKI COLLEGE OF TECH. (JAPAN)
UNIV. OF ILLINOIS, CHICAGO CIRCLE
UNIVERSITY OF ILLINOIS, CHAMPAIGN
INDIANA UNIVERSITY
IOWA STATE UNIVERSITY
JINR, DUBNA (RUSSIA)
JOHNS HOPKINS UNIVERSITY
KEK (JAPAN)
KYOTO UNIVERSITY (JAPAN)
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF LIVERPOOL (ENGLAND)
UNIVERSITY OF MARYLAND
UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
ACADEMY OF SCI. OF BSSR (BYELARUS)
UNIVERSITY OF MISSISSIPPI
MIYAZAKI UNIVERSITY (JAPAN)
NAGOYA UNIVERSITY (JAPAN)
NIIGATA UNIVERSITY (JAPAN)
NOTRE DAME UNIVERSITY
OAK RIDGE NATIONAL LABORATORY
OHIO STATE UNIVERSITY
OKAYAMA UNIVERSITY (JAPAN)
OSAKA CITY UNIVERSITY (JAPAN)
OSAKA UNIVERSITY (JAPAN)
UNIVERSITY OF OXFORD (ENGLAND)
PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY OF PENNSYLVANIA
UNIVERSITY OF PISA (ITALY)
UNIVERSITY OF PITTSBURGH
PURDUE UNIVERSITY
RICE UNIVERSITY
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY
RUTGERS UNIVERSITY
RUTHERFORD-APPLETON LABS.(ENGLAND)
SAGA UNIVERSITY (JAPAN)
SAITAMA COLLEGE OF HEALTH (JAPAN)
SLOVAK ACADEMY OF SCIENCE (CZECH)
SOFIA STATE UNIVERSITY (BULGARIA)
SSC LABORATORY
SLAC
TASHKENT, PHY.TEC.INS (UZBEKISTAN)
IHEP, TBILISI STATE UNIV (GEORGIA)
TEXAS A&M UNIVERSITY
UNIVERSITY OF TEXAS AT DALLAS
TOHOKU GAKUIN UNIVERSITY (JAPAN)
TOHOKU UNIVERSITY (JAPAN)
TOKYO INST. OF TECHNOLOGY (JAPAN)
TOKYO METROPOLITAN UNIV. (JAPAN)
TOKYO UNIV. OF AGR. & TECH.(JAPAN)
UNIVERSITY OF TOKYO (JAPAN)
UNIVERSITY OF TSUKUBA (JAPAN)
TUFTS UNIVERSITY
VIRGINIA POLYTECHNIC INSTITUTE
WAKAYAMA MEDICAL COLLEGE (JAPAN)
UNIVERSITY OF WASHINGTON
UNIVERSITY OF WISCONSIN-MADISON
YEREVAN PHYSICS INST. (ARMENIA)

Request	1 Oct, 90	Unspecified
Inactive	23 Dec, 92	

826 HYPERON MEASUREMENTS #826 — **Kenneth A. Johns and Regina A. Rameika**

BEAM: Proton Area - Center

An Expression of Interest to Continue Hyperon Measurements at Fermilab

UNIVERSITY OF ARIZONA
FERMILAB
UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA

Request	8 Oct, 90	Unspecified
Inactive	23 Dec, 92	

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827 MICRO-BCD #827 — Nigel S. Lockyer

BEAM: Collision Area (C-0)
B Physics at the TEV I; Micro-BCD

UNIVERSIDAD DE LOS ANDES(COLOMBIA)
UNIV. OF CALIFORNIA, DAVIS
FERMILAB
UNIVERSITY OF FLORIDA
UNIV. OF ILLINOIS, CHICAGO CIRCLE
ILLINOIS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF IOWA
UNIVERSITY OF MONTREAL (CANADA)
SUNY AT ALBANY
OAK RIDGE NATIONAL LABORATORY
UNIVERSITY OF OKLAHOMA
UNIVERSITY OF PENNSYLVANIA
PRAIRIE VIEW A&M UNIVERSITY
PRINCETON UNIVERSITY
UNIVERSITY OF PUERTO RICO
UN.SAN FRANCISCO DE QUITO(ECUADOR)
SPACE SCIENCE LAB., U.C., BERKELEY
UNIVERSITY OF WISCONSIN-MADISON
YALE UNIVERSITY

Request	8 Oct, 90	Unspecified
Rejected	10 Jul, 91	

828 B-MESON CP VIOLATION #828 — Sheldon L. Stone

BEAM: Collision Area (Miscellaneous)
Letter of Intent to Measure CP Violation in B Meson Decay at the Fermilab Collider

FERMILAB
UNIVERSITY OF FLORIDA
UNIVERSITY OF MICHIGAN
SYRACUSE UNIVERSITY

Request	26 Sep, 90	Unspecified
Withdrawn	22 Jun, 91	

829 HEAVY FLAVORS AT TPL #829 — Jeffrey A. Appel and Milind Vasant Purohit

BEAM: Proton Area - East
Study of Heavy Flavors at TPL, Continuation of E-791

UNIV. OF CALIFORNIA, SANTA CRUZ
CBPF (BRAZIL)
FERMILAB
ILLINOIS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF MISSISSIPPI
PRINCETON UNIVERSITY
UNIV. FEDERAL DO RIO DE JANEIRO
UNIVERSITY OF TEL-AVIV (ISRAEL)
TUFTS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

Request	8 Oct, 90	Unspecified
Unconsidered	8 Oct, 90	

830 CDF UPGRADE #830 — Melvyn Jay Shochet and William C. Carithers

BEAM: Collision Area (B-0)
Proposal for an Upgraded CDF Detector

ARGONNE NATIONAL LABORATORY
UNIVERSITY OF BOLOGNA (ITALY)
BRANDEIS UNIVERSITY
UNIV. OF CALIFORNIA, LOS ANGELES
CIPP (CANADA)
UNIVERSITY OF CHICAGO
DUKE UNIVERSITY
FERMILAB
INFN, FRASCATI (ITALY)
HARVARD UNIVERSITY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
JOHNS HOPKINS UNIVERSITY
KEK (JAPAN)
LAWRENCE BERKELEY LABORATORY
MASSACHUSETTS INST. OF TECHNOLOGY
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF MICHIGAN
UNIVERSITY OF NEW MEXICO
OSAKA CITY UNIVERSITY (JAPAN)
UNIVERSITY OF PADOVA (ITALY)
UNIVERSITY OF PENNSYLVANIA
INFN, PISA (ITALY)
UNIVERSITY OF PITTSBURGH
PURDUE UNIVERSITY
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY
RUTGERS UNIVERSITY
SSC LABORATORY
TEXAS A&M UNIVERSITY
UNIVERSITY OF TSUKUBA (JAPAN)
TUFTS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON
YALE UNIVERSITY

Request	9 Oct, 90	Unspecified
Unscheduled	11 Jul, 91	

831 HEAVY QUARK PHOTOPRODUCTION #831 — John P. Cumalat

BEAM: Proton Area - Broad Band
A High Statistics Study of States Containing Heavy Quarks Using the Wideband Photon Beam and the E687 Multiparticle Spectrometer

INFN, BOLOGNA (ITALY)
UNIV. OF CALIFORNIA, DAVIS
UNIVERSITY OF COLORADO AT BOULDER
FERMILAB
INFN, FRASCATI (ITALY)
UNIVERSITY OF ILLINOIS, CHAMPAIGN
NORTHERN KENTUCKY UNIVERSITY
KOREA UNIVERSITY, SEOUL (KOREA)
INFN, MILANO (ITALY)
UNIVERSITY OF MILANO (ITALY)
UNIVERSITY OF NORTH CAROLINA
NOTRE DAME UNIVERSITY
UNIVERSITY OF PAVIA (ITALY)
UNIVERSITY OF PUERTO RICO
UNIVERSITY OF SOUTH CAROLINA
UNIVERSITY OF TENNESSEE, KNOXVILLE
VANDERBILT UNIVERSITY

Request	17 Oct, 90	Unspecified
	1 Sep, 92	5,000 Hours 1000 hours for setup and 4000 hours for data taking
Approval	7 Dec, 92	Unspecified
Unscheduled	7 Dec, 92	

Fermi National Accelerator Laboratory
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(continued)

832 CP VIOLATION #832 — **Yee Bob Hsiung and Bruce D. Winstein**

BEAM: Unspecified Beam
Proposal for a New Tevatron Search for Direct CP Violation in the 2pi decays of the Neutral Kaon

UNIV. OF CALIFORNIA, LOS ANGELES
UNIVERSITY OF CHICAGO
UNIVERSITY OF COLORADO AT BOULDER
ELMHURST COLLEGE
FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
OSAKA UNIVERSITY (JAPAN)
RICE UNIVERSITY
RUTGERS UNIVERSITY

Request	18 Oct, 90	Unspecified
Unscheduled	1 Jun, 92	

833 K-SHORT DECAYS #833 — **Gordon B. Thomson**

BEAM: Meson Area - Center
Letter of Intent to Measure the Branching Ratio for the K-short Decay

UNIV. OF CALIFORNIA, LOS ANGELES
UNIVERSITY OF CHICAGO
ELMHURST COLLEGE
FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
RUTGERS UNIVERSITY

Request	19 Oct, 90	Unspecified
Unconsidered	19 Oct, 90	

834 DIRECT PHOTON #834 — **Paul F. Slattery**

BEAM: Meson Area - West
Direct Photon Production #834

DELHI UNIVERSITY (INDIA)
FERMILAB
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF MINNESOTA
NORTHEASTERN UNIVERSITY
PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY OF PITTSBURGH
RAJASTHAN UNIVERSITY (INDIA)
UNIVERSITY OF ROCHESTER

Request	19 Oct, 90	Unspecified
Inactive	23 Dec, 92	

835 CHARMONIUM STATES #835 — **Rosanna Cester**

BEAM: Accumulator Ring
Proposal to Continue the Study of Charmonium Spectroscopy in Proton-AntiProton Annihilations

UNIV. OF CALIFORNIA, IRVINE
FERMILAB
UNIVERSITY OF FERRARA (ITALY)
INFN, GENOVA (ITALY)
NORTHWESTERN UNIVERSITY
PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY OF TORINO (ITALY)
UNIVERSITY OF TURIN

Request	16 Oct, 90	Unspecified
Approval	7 Dec, 92	Unspecified
Unscheduled	7 Dec, 92	

836 SUPERCONDUCTING DETECTOR TEST #836 — **Robert G. Wagner**

BEAM: Unspecified Beam
Proposal for a Beam Test of a Superconducting Thin Film Strip Particle Detector

ARGONNE NATIONAL LABORATORY

Request	3 Oct, 90	24 Hours in three 8 hour shifts
Withdrawn	8 Jan, 92	

837 EMPACT/TEXAS TEST #837 — **Michael D. Marx**

BEAM: Unspecified Beam
EMPACT/TEXAS Beam Test(s)

SUNY AT STONY BROOK

Request	12 Oct, 90	Unspecified
Inactive	23 Dec, 92	

838 POLARIZED BEAM #838 — **Akihiko Yokosawa**

BEAM: Meson Area - Polarized Proton Beam
Continuation of E-704 and Simultaneous Measurement of Chi-2 Production

ARGONNE NATIONAL LABORATORY
CEN-SACLAY (FRANCE)
FERMILAB
UNIVERSITY OF IOWA
KYOTO SANGYO UNIVERSITY (JAPAN)
KYOTO UNIVERSITY (JAPAN)
KYOTO UNIV. OF EDUCATION (JAPAN)
LAPP, D'ANNECY-LE-VIEUX (FRANCE)
LOS ALAMOS NATIONAL LABORATORY
INFN, MESSINA (ITALY)
NEW MEXICO STATE UNIVERSITY
NORTHWESTERN UNIVERSITY
UN. OF OCCUP. & ENV. HEALTH(JAPAN)
OKAYAMA UNIVERSITY (JAPAN)
OLD DOMINION UNIVERSITY
OSAKA CITY UNIVERSITY (JAPAN)
OSAKA UNIV. OF COMMERCE (JAPAN)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
RICE UNIVERSITY
UNIVERSITY DI TRIESTE (ITALY)
UNIVERSITY OF UDINE (ITALY)

Request	1 Oct, 90	Unspecified
Rejected	19 Feb, 91	

839 FIBER TRACKING TEST #839 — **Seymour Margulies**

BEAM: Neutrino Area - Muon Beam
Scintillating Fiber Tracker - Beam Test

UNIV. OF CALIFORNIA, LOS ANGELES
FERMILAB
UNIV. OF ILLINOIS, CHICAGO CIRCLE
NOTRE DAME UNIVERSITY
OSAKA CITY UNIVERSITY (JAPAN)
PENNSYLVANIA STATE UNIVERSITY
PURDUE UNIVERSITY
RICE UNIVERSITY
UNIVERSITY OF TEXAS AT DALLAS
UNIVERSITY OF TSUKUBA (JAPAN)

Request	25 Sep, 90	Unspecified
Approval	15 Apr, 91	Unspecified
Completed	8 Jan, 92	Unspecified

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840 SPAGHETTI CALORIMETRY TEST #840 — Adam Para — FERMILAB

BEAM: Meson Area - Polarized Proton Beam
Spaghetti calorimetry in '91 test beam cycle

Request	11 Oct, 90	592 Hours	1. Systematic studies of the laminated prototype (160 hrs.) 2. Studies of the RGB prototype (56 hrs.) 3. Dichromatic calorimeter (80 hrs.) 4. Liquid scintillator prototype (56 hrs.) 5. Two-segment fiber prototype (240 hrs.)
Approval	8 Aug, 91	Unspecified	
Completed	8 Jan, 92	Unspecified	

841 CALORIMETER BEAM TEST #T841 — Lawrence E. Price — ARGONNE NATIONAL LABORATORY, CEN-SACLAY (FRANCE), FERMILAB, IOWA STATE UNIVERSITY, LAWRENCE BERKELEY LABORATORY, NORTHEASTERN UNIVERSITY, PURDUE UNIVERSITY, UNIVERSITY OF ROCHESTER, ROCKEFELLER UNIVERSITY, UNIVERSITY OF SOUTH CAROLINA, VIRGINIA POLYTECHNIC INSTITUTE, WESTINGHOUSE ELECTRIC CORPORATION, UNIVERSITY OF WISCONSIN-MADISON, YALE UNIVERSITY

BEAM: Meson Area - Test Beam
Proposal for Beam Test of Scintillator Calorimeter Prototypes at Fermilab during FY 1991

Request	8 Oct, 90	Unspecified
Approval	28 Mar, 91	Unspecified
Completed	8 Jan, 92	Unspecified

842 RADIATION EXPOSURE #842 — David G. Underwood — ARGONNE NATIONAL LABORATORY

BEAM: Proton Area - Broad Band
Proposed Radiation Measurement in the Wideband Neutral Dump Area

Request	6 Nov, 90	Unspecified
Approval	15 Aug, 91	Unspecified
Completed	8 Jan, 92	Unspecified

843 EMULSION EXPOSURE 600 GeV #843 — C. O. Kim — CHONNAM NATIONAL UNIVERSITY(KOREA), KOREA UNIVERSITY, SEOUL (KOREA)

BEAM: Neutrino Area - Muon Beam
Interactions of 600 Gev Muons with Emulsion Nuclei

Request	24 Oct, 90	Unspecified
Approval	1 Jul, 91	Unspecified
Completed	13 Jul, 91	Unspecified

844 TRD/SHOWER COUNTER TEST #844 — Simon P. Swordy — ENRICO FERMI INSTITUTE

BEAM: Meson Area - Polarized Proton Beam
Transition Radiation Detector/EM Shower Counter Calibration

Request	28 Nov, 90	40 Hours
Approval	11 Oct, 91	Unspecified
Completed	26 Dec, 91	Unspecified

845 TEVATRON BEAUTY #845 — Peter E. Schlein — UNIV. OF CALIFORNIA, LOS ANGELES, CERN (SWITZERLAND), COLLEGE DE FRANCE (FRANCE), INP, KRAKOW (POLAND), MAX-PLANCK INSTITUTE (GERMANY), NANJING UNIVERSITY (PRC), IHEP, PROTVINO (SERPUKHOV)(RUSSIA), YALE UNIVERSITY

BEAM: Unspecified Beam
A Dedicated Beauty Experiment for the Tevatron Collider

Request	7 Jan, 91	Unspecified
Rejected	10 Jul, 91	

846 FRACTIONAL CHARGE IMPURITIES #846 — Unil Perera — UNIVERSITY OF PITTSBURGH

BEAM: Meson Area - West
Search for Fractional Charge Impurities

Request	1 Feb, 91	Unspecified
Inactive	23 Dec, 92	

847 CALORIMETER TEST #847 — Lawrence R. Sulak — BOSTON UNIVERSITY

BEAM: Unspecified Beam
Beam Test for scintillating fiber / lead alloy calorimeter prototype

Request	15 Feb, 91	Unspecified
Completed	8 Jan, 92	

848 GAS CALORIMETRY FOR SDC #848 — Nikos Giokaris — ABILITY ENGINEERING TECHNOLOGY, FERMILAB, JINR, DUBNA (RUSSIA), UNIVERSITY OF ROCHESTER, ROCKEFELLER UNIVERSITY, UNIVERSITY OF WISCONSIN-MADISON, YEREVAN PHYSICS INST. (ARMENIA)

BEAM: Neutrino Area - Test Beam
High Pressure Sampling Gas Calorimetry for the SDC Calorimeter

Request	29 Mar, 91	Unspecified
Approval	29 Oct, 91	Unspecified
Completed	23 Dec, 91	Unspecified

849 BARIUM FLUORIDE CALORIMETER #849 — Hans G. E. Kobrak — BROOKHAVEN NATIONAL LABORATORY, CALIFORNIA INSTITUTE OF TECHNOLOGY, UNIV. OF CALIFORNIA, SAN DIEGO, CARNEGIE-MELLON UNIVERSITY, OAK RIDGE NATIONAL LABORATORY, PRINCETON UNIVERSITY, TATA INSTITUTE (INDIA)

BEAM: Neutrino Area - Test Beam
Request for Test Beam Time for Barium Fluoride Calorimeter Development

Request	11 Apr, 91	Unspecified	Two (2) "beam on" periods of about 1 month each, separated by a data analysis period of about 1 month.
Approval	18 Sep, 91	Unspecified	
Completed	8 Jan, 92	Unspecified	

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850 DIAMOND RADIATION DETECTOR TEST #850 **Melissa Franklin**
BEAM: Meson Area - Test Beam
Fermilab Test Beam Time of Diamond Radiation Detectors

UNIV. OF CALIFORNIA, SANTA BARBARA
HARVARD UNIVERSITY
KEK (JAPAN)
LAWRENCE LIVERMORE LABORATORY
OHIO STATE UNIVERSITY
PRINCETON UNIVERSITY
UNIVERSITY OF ROCHESTER
RUTGERS UNIVERSITY
SSC LABORATORY
STANFORD UNIVERSITY

Request	1 May, 91	Unspecified
Approval	8 Jan, 92	Unspecified
Withdrawn	8 Jan, 92	Unspecified

851 FIBER IRRADIATION STUDIES #851 **Seymour Margulies and Jadwiga Piekarz**
BEAM: Collision Area (C-0)
Fiber Irradiation Studies in the C0 Region

UNIV. OF CALIFORNIA, LOS ANGELES
FERMILAB
UNIV. OF ILLINOIS, CHICAGO CIRCLE
NOTRE DAME UNIVERSITY
OAK RIDGE NATIONAL LABORATORY
OSAKA CITY UNIVERSITY (JAPAN)
PENNSYLVANIA STATE UNIVERSITY
PURDUE UNIVERSITY
RICE UNIVERSITY
UNIVERSITY OF TEXAS AT DALLAS
UNIVERSITY OF TSUKUBA (JAPAN)

Request	1 May, 91	Unspecified
Approval	14 Aug, 91	Unspecified
Completed	8 Jan, 92	Unspecified

852 PIXEL DETECTOR TEST #T852 **Eric Arens**
BEAM: Neutrino Area - Muon Beam
Pixel Detector Test at NM

FERMILAB
LAWRENCE BERKELEY LABORATORY

Request	8 May, 91	Unspecified
Approval	9 Sep, 91	Unspecified
Completed	23 Dec, 91	Unspecified

853 TEVATRON CRYSTAL EXTRACTION #853 **C. Thornton Murphy**
BEAM: Collision Area (C-0)
A Test of Low Intensity Extraction from the Tevatron Using Channeling in a Bent Crystal

UNIV. OF CALIFORNIA, LOS ANGELES
CEBAF
FERMILAB
JINR, DUBNA (RUSSIA)
UNIVERSITY OF NEW MEXICO
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
SSC LABORATORY
NPI, ST. PETERSBURG (RUSSIA)
UNIVERSITY OF TEXAS AT AUSTIN
UNIVERSITY OF VIRGINIA
UNIVERSITY OF WISCONSIN-MADISON

Request	22 May, 91	100 Hours of dedicated Tevatron time, during which only protons need to be circulating.
Approval	9 Jul, 92	Unspecified
Set Up in a Year	9 Jul, 92	

854 MUON FLUXES IN THE DEBUNCHER #854 **Alan D. Bross**
BEAM: Debuncher Ring
Proposal to Measure the Flux of Ciculating Muons in the Debuncher.

COLUMBIA UNIVERSITY
FERMILAB

Request	11 Jul, 91	Unspecified
Approval	8 Jan, 92	Unspecified
Completed	8 Jan, 92	Unspecified

855 dE/dx MUONS #855 **George R. Kalbfleisch**
BEAM: Neutrino Area - Muon Beam
Test Beam Request to Directly Measure dE/dx of High Energy Muons from 150 to 650 GeV/c in Muon Laboratory

UNIVERSITY OF OKLAHOMA
SSC LABORATORY

Request	3 Aug, 91	Unspecified
Approval	18 Nov, 91	Unspecified
Completed	8 Jan, 92	Unspecified

856 INTEGRATED PIXEL DETECTOR TEST#856 **Sherwood I. Parker**
BEAM: Neutrino Area - Muon Beam
An Integrated Pixel Detector - Test Beam Request

UNIVERSITY OF HAWAII AT MANOA
LAWRENCE BERKELEY LABORATORY
STANFORD UNIVERSITY

Request	4 Oct, 91	Unspecified
Approval	11 Oct, 91	Unspecified
Completed	8 Jan, 92	Unspecified

857 SPIN-TENSOR #857 **L. I. Sarycheva**
BEAM: Unspecified Beam
Proposal to measure all components of the depolarization tensor.

MOSCOW STATE UNIVERSITY (RUSSIA)

Request	10 Dec, 91	Unspecified
Inactive	23 Dec, 92	

858 ELASTIC SCATTERING SPIN EFFECTS #858 **Alan D. Krisch**
BEAM: Unspecified Beam
Spin Effects in High Proton-Proton Elastic Scattering

FERMILAB
INDIANA UNIVERSITY
JINR, DUBNA (RUSSIA)
KEK (JAPAN)
UNIVERSITY OF MICHIGAN
MOSCOW STATE UNIVERSITY (RUSSIA)
UNIVERSITY OF NORTH CAROLINA
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)

Request	6 Jan, 92	Unspecified
Rejected	30 Jul, 92	

859 CP VIOLATION IN HYPERON DECAY #859 **Shao Yuan Hsueh**
BEAM: Unspecified Beam
CP Violations in Hyperon Decay

FERMILAB

Request	2 Jan, 92	Unspecified
Unconsidered	2 Jan, 92	

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860 SEARCH FOR NEUTRINO OSCILLATIONS#860 — Wonyong Lee

BEAM: Debuncher Ring
A Search for Neutrino Oscillations using the Fermilab Debuncher.

BROOKHAVEN NATIONAL LABORATORY
COLUMBIA UNIVERSITY
FERMILAB
KANGNUNG NATIONAL UNIV. (KOREA)
KOREA UNIVERSITY, SEOUL (KOREA)
SEOUL NATIONAL UNIVERSITY (KOREA)

Request	14 Jan, 92	Unspecified
Deferred	16 Jul, 92	

861 ANTIPROTON DECAY #T861 — Steve Geer

BEAM: Accumulator Ring
Test of Backgrounds for an Antiproton Decay Search Experiment at the Antiproton Accumulator

UNIV. OF CALIFORNIA, LOS ANGELES
FERMILAB
PENNSYLVANIA STATE UNIVERSITY

Request	10 Feb, 92	24 Hours
Completed	29 Oct, 92	

862 ANTI-HYDROGEN DETECTION #862 — Charles T. Munger

BEAM: Accumulator Ring
Proposal for the Detection of Relativistic Anti-Hydrogen Atoms Produced by Pair Production with Positron Capture

UNIV. OF CALIFORNIA, IRVINE
FERMILAB
PENNSYLVANIA STATE UNIVERSITY
SLAC

Request	27 Aug, 92	Unspecified
Unconsidered	27 Aug, 92	

863 NUCLEON SPIN #863 — Aldo Penzo

BEAM: Meson Area - Polarized Proton Beam
Nucleon Spin Structure Studies with Polarized Proton and Antiproton Beams

ARGONNE NATIONAL LABORATORY
CEN-SACLAY (FRANCE)
CNRS, MARSEILLE (FRANCE)
UNIVERSITY OF IOWA
KYOTO SANGYO UNIVERSITY (JAPAN)
KYOTO UNIVERSITY (JAPAN)
KYOTO UNIV. OF EDUCATION (JAPAN)
LAPP, D'ANNECY-LE-VIEUX (FRANCE)
INFN, MESSINA (ITALY)
NEW MEXICO STATE UNIVERSITY
UN. OF OCCUP. & ENV. HEALTH(JAPAN)
OKAYAMA UNIVERSITY (JAPAN)
OSAKA CITY UNIVERSITY (JAPAN)
IHEP, PROTVINO (SERPUKHOV)(RUSSIA)
RICE UNIVERSITY
UNIVERSITY DI TRIESTE (ITALY)

Request	31 Aug, 92	7 Months
Rejected	7 Dec, 92	

864 MAXIMUM ACCEPTANCE DETECTOR #864 — James D. Bjorken and Michael J. Longo

BEAM: Collision Area (C-0)
Maximum Acceptance Detector for the Fermilab Collider (MAX)

DUKE UNIVERSITY
FERMILAB
UNIVERSITY OF MICHIGAN
SLAC
UNIVERSITY OF WASHINGTON

Request	1 Sep, 92	Unspecified
Deferred	7 Dec, 92	

865 LOW-MULTIPLICITY BEAUTY DECAYS #865 — Daniel M. Kaplan

BEAM: Meson Area - East
High-Sensitivity Study of Rare Low-Multiplicity Beauty Decays

ABILENE CHRISTIAN UNIVERSITY
UNIV. OF CALIFORNIA, LOS ANGELES
CEN-SACLAY (FRANCE)
CERN (SWITZERLAND)
UNIVERSITY OF CHICAGO
FERMILAB
UNIVERSITE DE LAUSANNE
NORTHERN ILLINOIS UNIVERSITY
UNIVERSITY OF SOUTH CAROLINA
UNIVERSITY OF TEXAS AT DALLAS

Request	1 Sep, 92	Unspecified
Unconsidered	1 Sep, 92	

866 ANTI(U-QUARK)/ANTI(D-QUARK) DIST#866 — G. T. Garvey

BEAM: Meson Area - East
Measurement of x distribution of the ratio of anti(u-quark) to anti(d-quark) in the proton

ABILENE CHRISTIAN UNIVERSITY
IHEP, ACADEMIA SINICA (TAIWAN)
CALIFORNIA INSTITUTE OF TECHNOLOGY
FERMILAB
LOS ALAMOS NATIONAL LABORATORY
NORTHERN ILLINOIS UNIVERSITY
TEXAS A&M UNIVERSITY

Request	2 Sep, 92	Unspecified
Approval	7 Dec, 92	Unspecified
Unscheduled	7 Dec, 92	

867 HIDDEN CHARM AND BEAUTY #867 — Bradley B. Cox

BEAM: Proton Area - West
A Proposal to Continue the Study of Hidden Charm and Beauty States by Triggering on High Transverse Momentum Single Muons and High Mass Dimuons in 800 GeV/c pN Interactions

UNIVERSITY OF SOUTH ALABAMA
UNIV. OF CALIFORNIA, BERKELEY
UNIV. OF CALIFORNIA, LOS ANGELES
DUKE UNIVERSITY
FERMILAB
UNIVERSITY OF HOUSTON
JINR, DUBNA (RUSSIA)
UNIVERSITY OF LECCE (ITALY)
MCGILL UNIVERSITY (CANADA)
ACADEMY OF SCI. OF BSSR (BYELARUS)
NANJING UNIVERSITY (PRC)
NORTHWESTERN UNIVERSITY
UNIVERSITY OF PAVIA (ITALY)
UNIVERSITY OF PENNSYLVANIA
PRAIRIE VIEW A&M UNIVERSITY
SHANDONG UNIVERSITY (PRC)
IHEP, TBILISI STATE UNIV (GEORGIA)
VANIER COLLEGE (CANADA)
UNIVERSITY OF VIRGINIA
UNIVERSITY OF WISCONSIN-MADISON
YEREVAN PHYSICS INST. (ARMENIA)

Request	3 Sep, 92	Unspecified
Unconsidered	3 Sep, 92	

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