Fermilab Research Program 1992

Workbook

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INTRODUCTION

This is the 18th Fermilab Research Program Workbook, which has for some time outgrown the original use as an aid to the Physics Advisory Committee in its annual review of the experimental program at the Laboratory. As in 1991, we have expanded the "Summaries of Approved Experiments" Section to include more information on an experiment's current status, including data analysis, publications and theses. Also as in 1991, we have included in that same Section descriptions of experiments that have completed data-taking, and are still under analysis.

Many people have contributed to this Workbook and deserve considerable thanks. Angela Gonzales, as for the past seventeen Workbooks, has done the artwork and many figures; Jud Parker keeps up the data bases used to provide the information used; Taiji Yamanouchi, Head of the Program Planning Office, has given assistance and encouragement. Lastly, and by no means least, Jackie Coleman 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	Withdrawn/Inactive	Proposals that were not considered at the request of the spokesperson or that are no longer being considered for other reasons.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, 860 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	*Jan* 1992
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	384
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
Subtotals	21	53	70	91	146	218	252	272	291	300	305	319	324	330	343	358	363	368	373	384	386	389	404
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
Deferred	29	35	39	43	54	45	25	24	11	2	10	7	9	11	2	0	1	0	0	0	0	0	2
"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
Subtotals	52	51	58	53	54	47	31	36	17	8	23	34	26	37	14	9	10	14	14	12	22	51	39
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
Withdrawn/Inactive	1	33	35	47	61	71	80	93	114	127	131	139	147	149	159	163	166	168	169	168	169	170	172
Subtotals	9	48	55	89	126	156	215	259	299	316	322	349	368	378	390	397	402	405	408	409	411	413	417
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

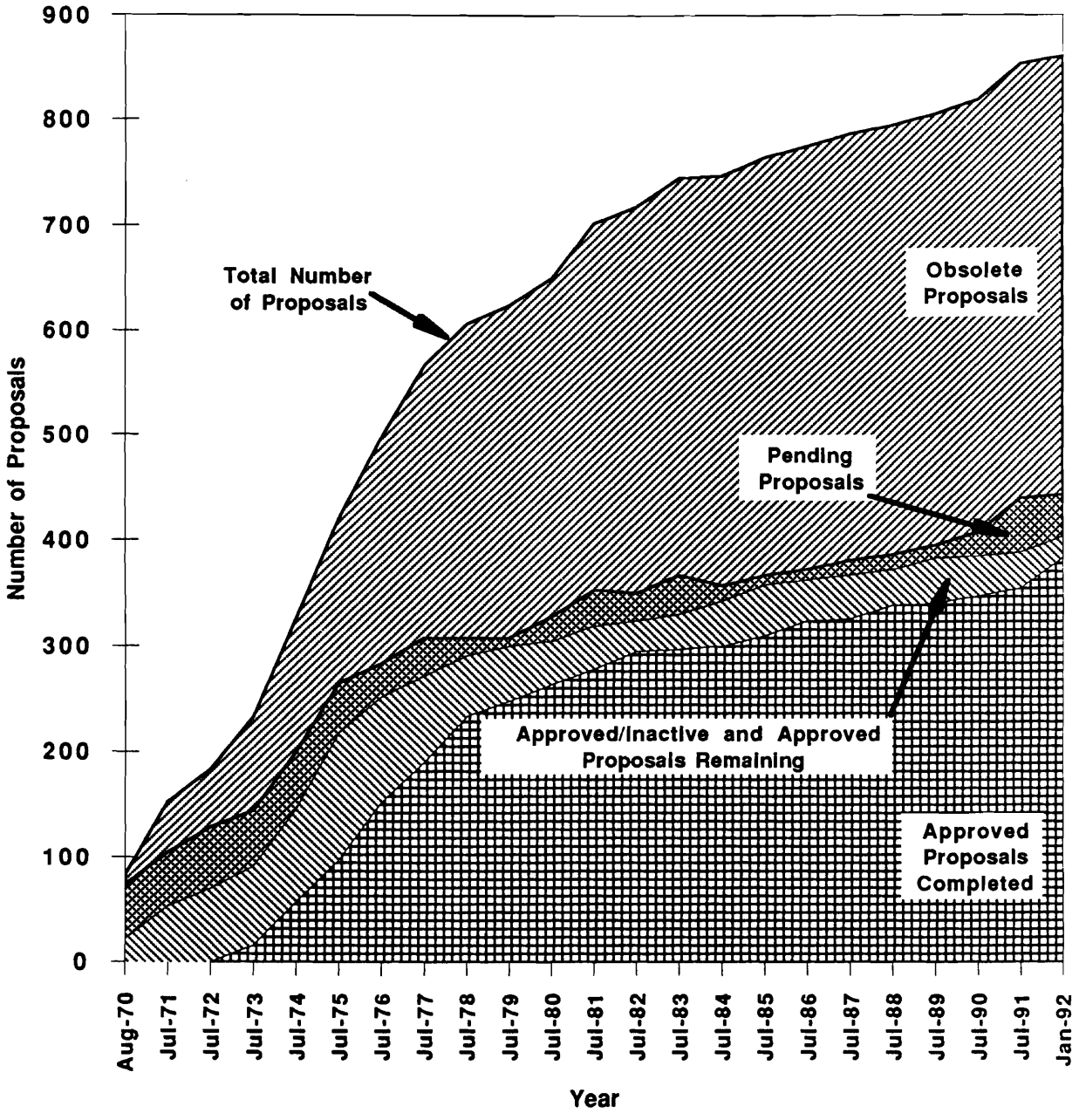


Figure 1. Growth of the Fermilab research program. The total number of approved experiments is obtained by adding the numbers shown as completed and those remaining and approved/inactive. Pending proposals are those which are unconsidered, deferred or "not approved;" obsolete proposals are rejected or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

SECTION II. ACCELERATOR PERFORMANCE

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

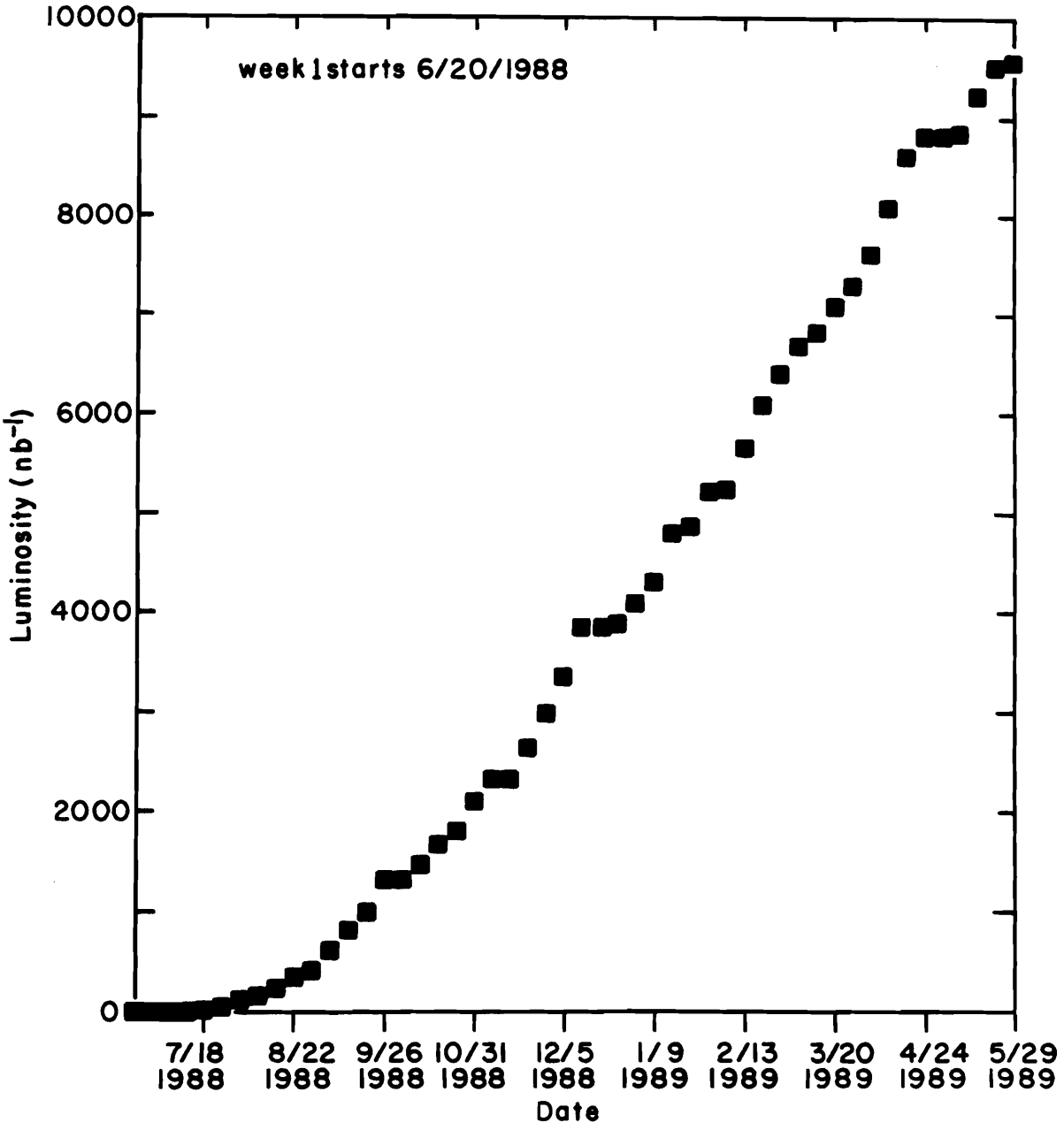


Figure 2. Tevatron Collider operation during the 1988/1989 running period - integrated luminosity delivered to CDF.

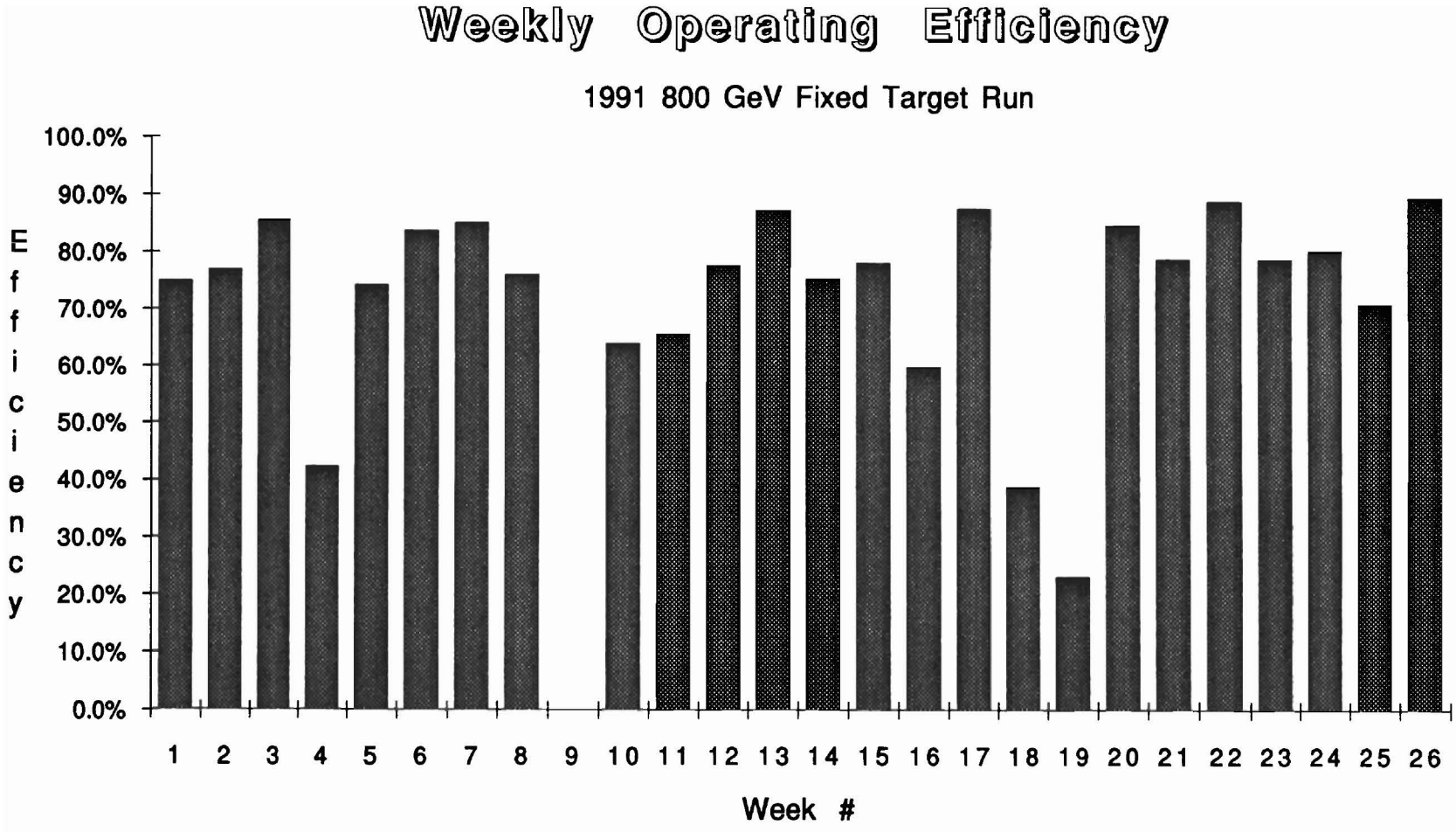


Figure 3. Weekly Operating Efficiency - 1991 Fixed Target Run

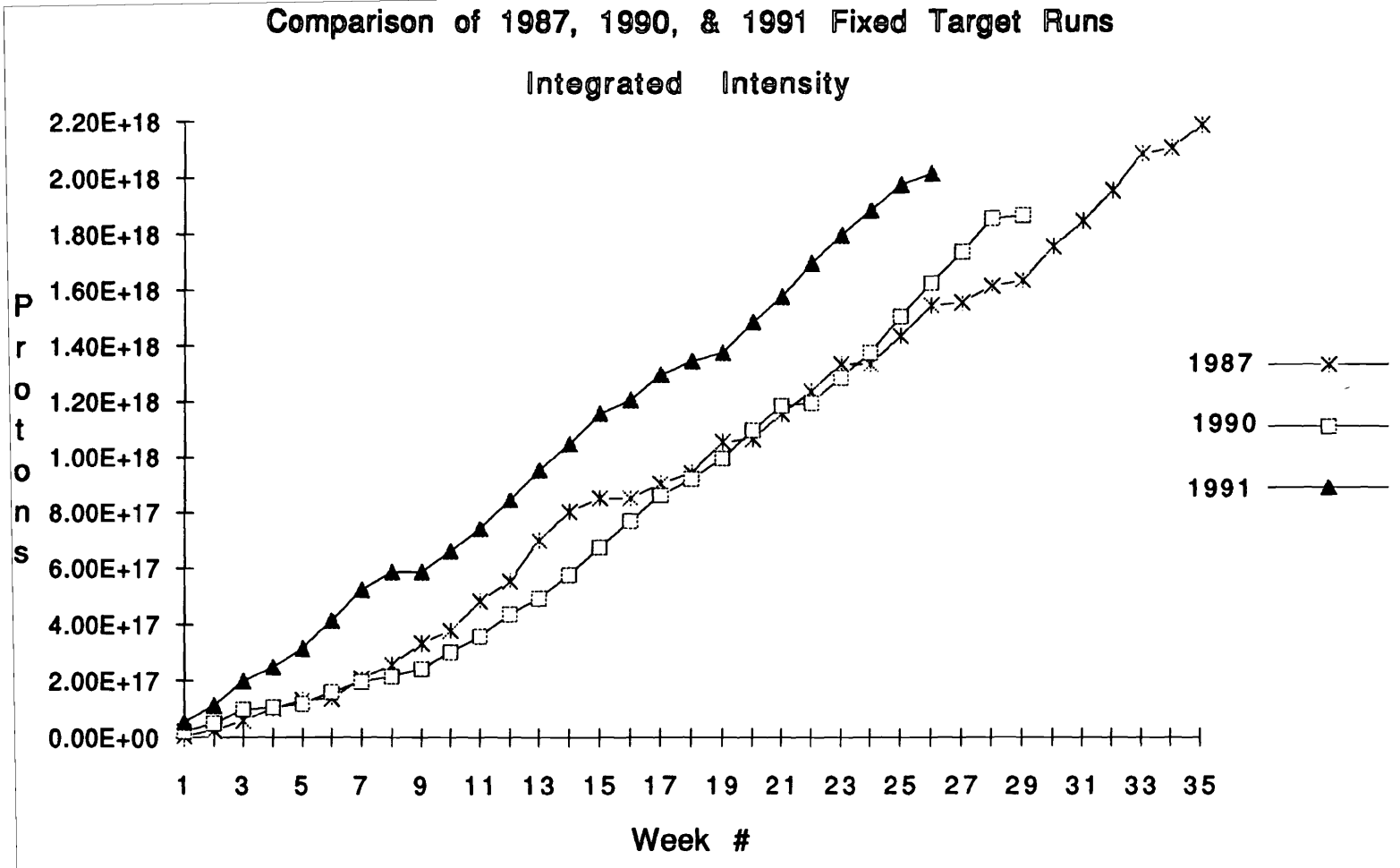


Figure 4. Integrated intensity for the 1987, 1990 and 1991 Fixed Target running periods.

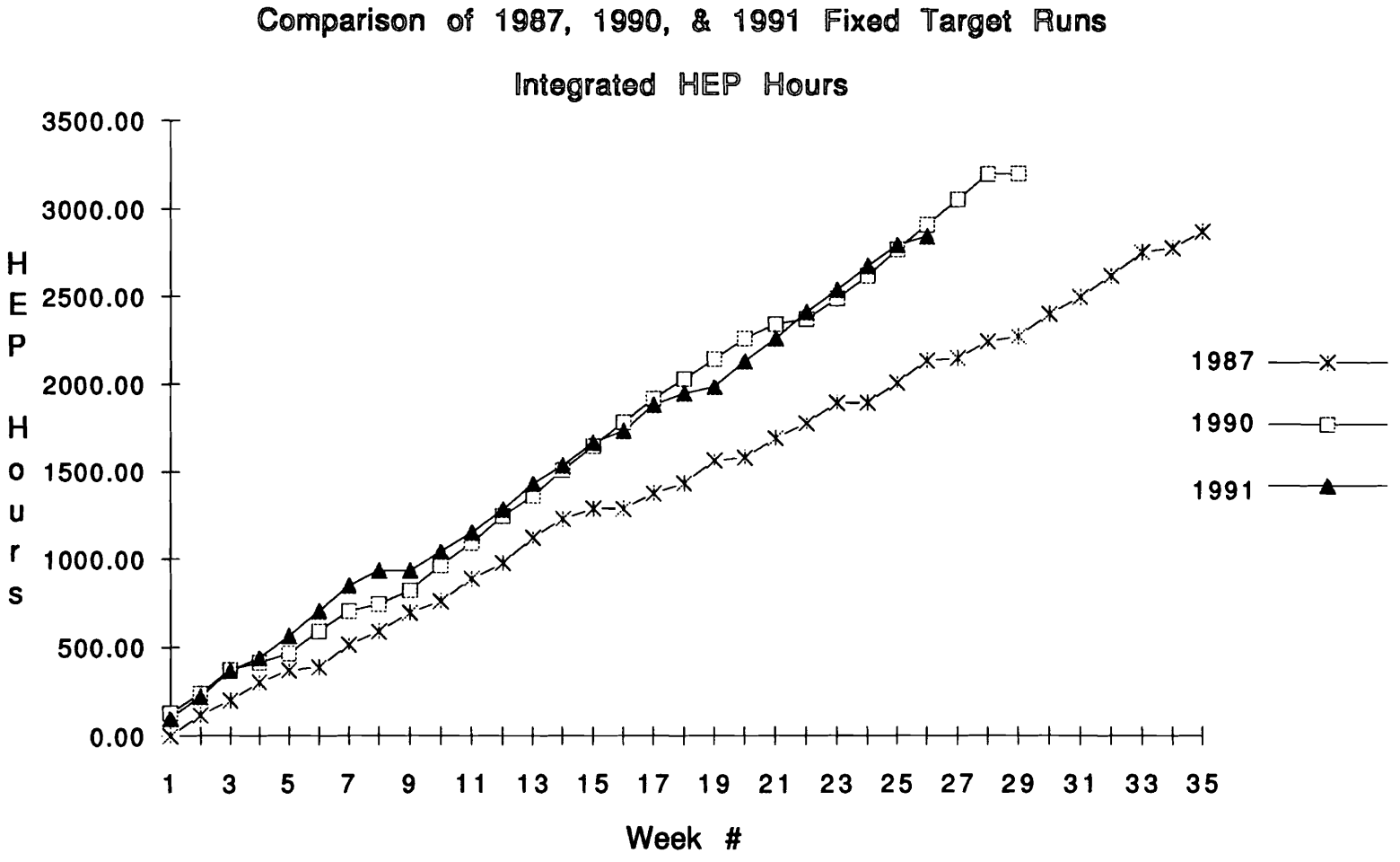


Figure 5. Integrated high energy physics hours for the 1987, 1990 and 1991 Fixed Target running periods.

SECTION III. FERMILAB BEAM PROPERTIES AND EXPERIMENT LOCATION

Table 2 gives properties of Fermilab beams; their location is shown in Figure 6. The locations of major experiments not yet completed by the beginning of 1992 are shown in Figure 7 (Fixed Target) and Figure 8 (Collider and Accumulator). Figures 9-14 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	300	High intensity pion beam
		4	1.5		$\pi^-,K^-,\bar{p}$	6×10^8	300	
					$\pi,\bar{p}$	1×10^7	300	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_L^o, 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 polarization expected $\sim$ 30%)
MC	50-150		1-6		K_L^o	4×10^6	variable	Neutral beam with 800 GeV primary
					n	1×10^7	variable	
MB	20-200	5.0	2.5		$\pi, K^\pm$	3×10^6	75-100	Low intensity wide-angle test beam
					e^-	2×10^2	100	
MT	80-245	5.0	0		hadrons	1×10^6	75-245	Test beam
					$e^\pm$	500	25	
						500-2500	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.

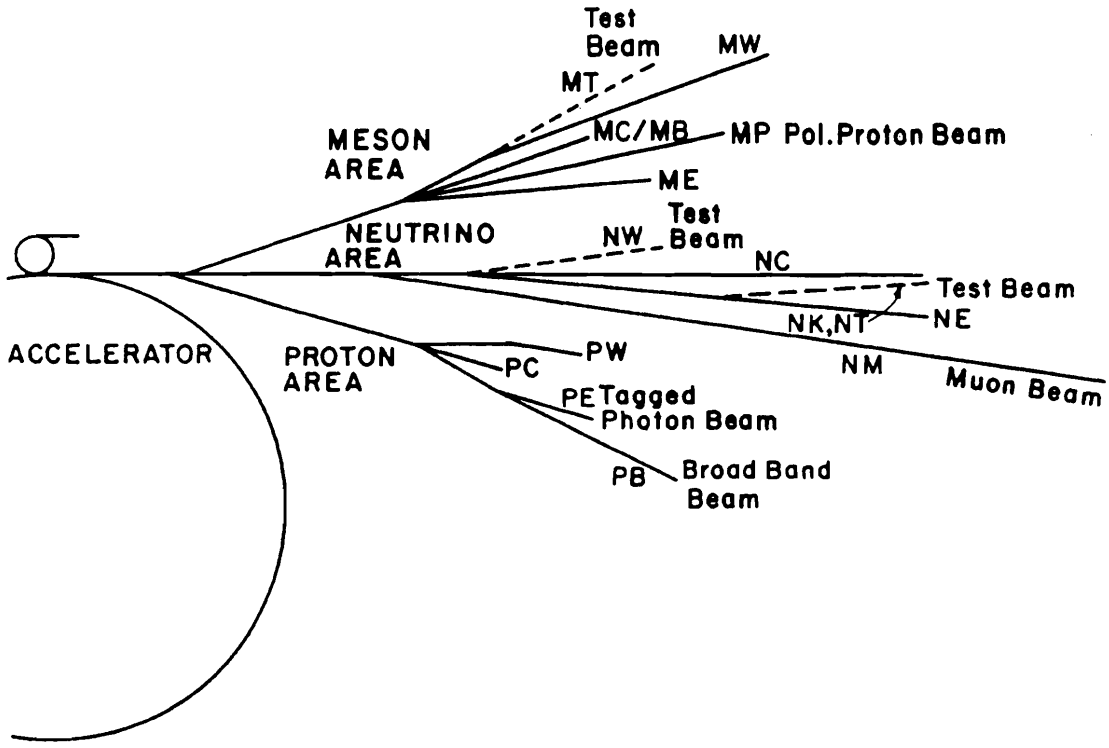


Figure 6. Layout of Fermilab Fixed Target beams. Properties of individual beams are given in Table 2.

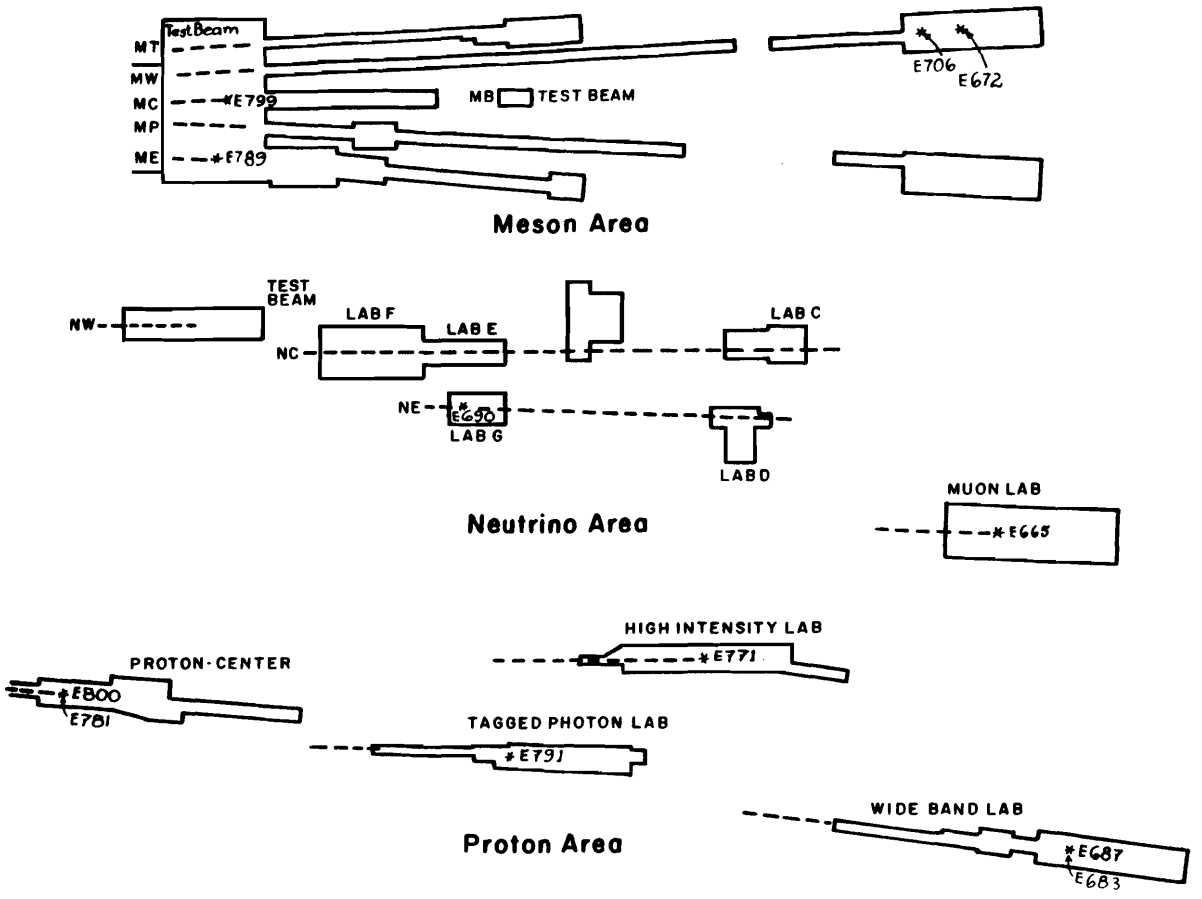


Figure 7. Schematic of the Fixed Target experimental areas with locations of major experiments not yet completed by the beginning of 1992. The drawings are not to scale.

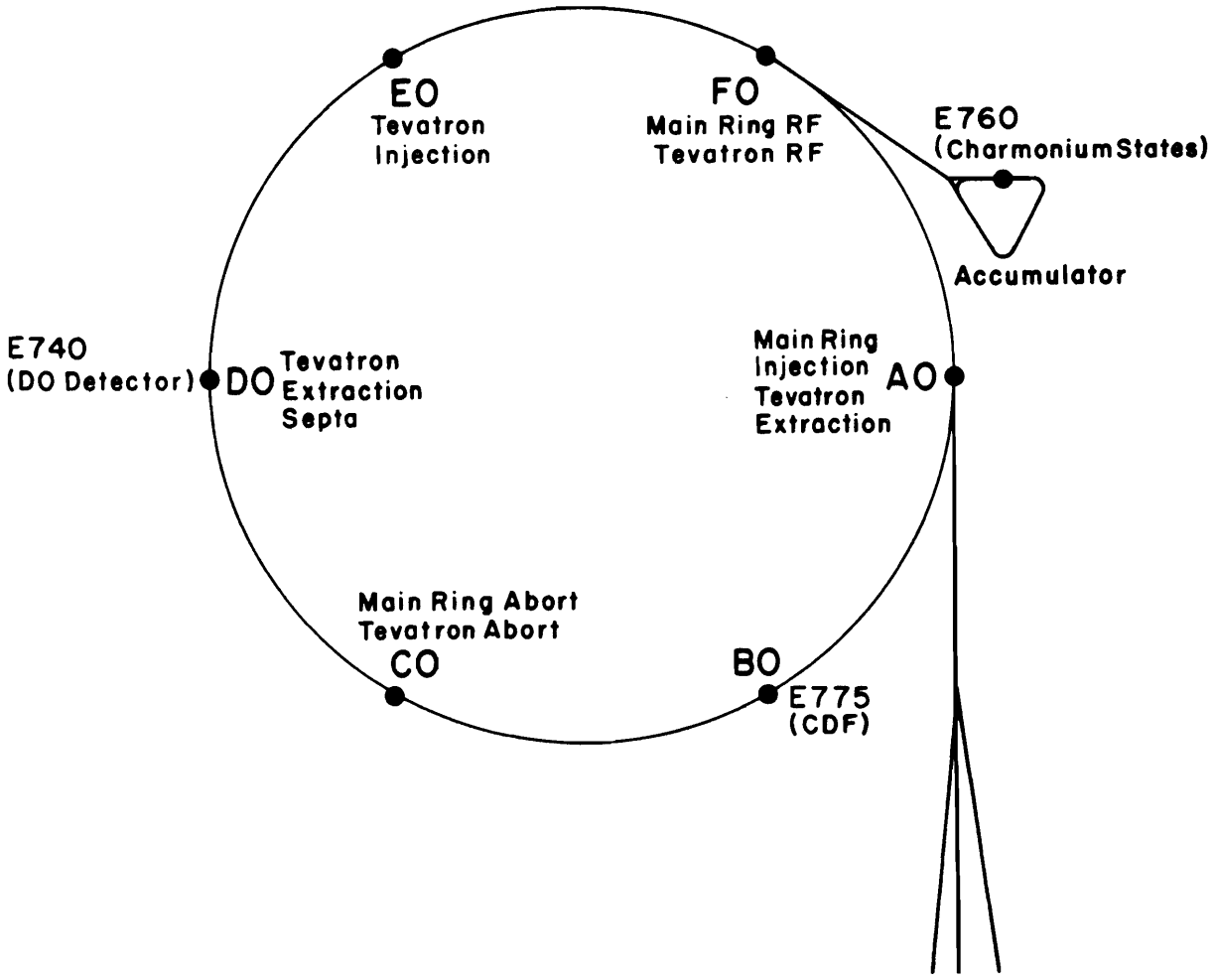


Figure 8. Locations in the Tevatron of the approved $p\bar{p}$ Collider experiments, and of the gas jet experiment in the Accumulator.

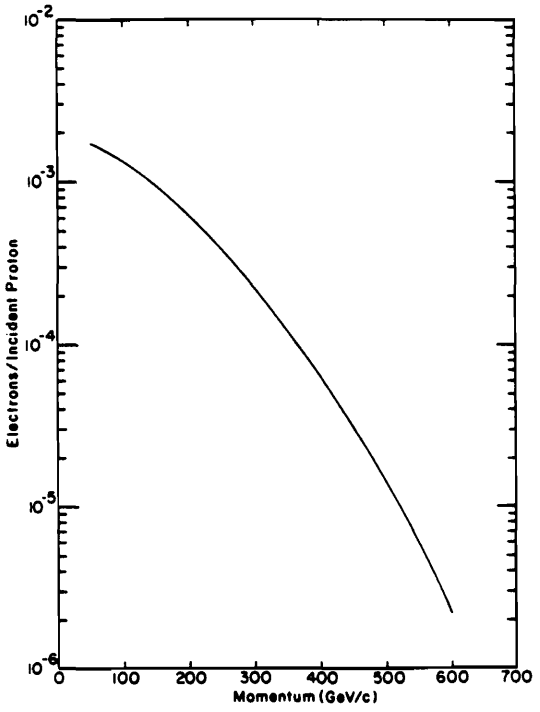


Figure 9.

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

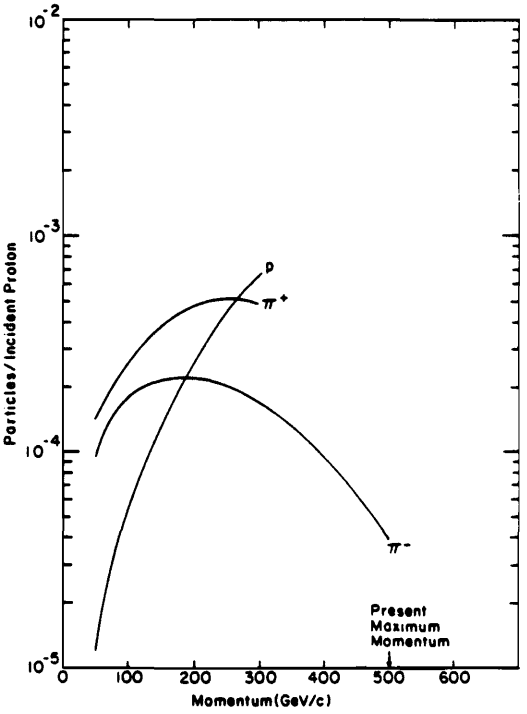


Figure 10.

Proton Area: Hadron flux in the Tagged Photon Laboratory.

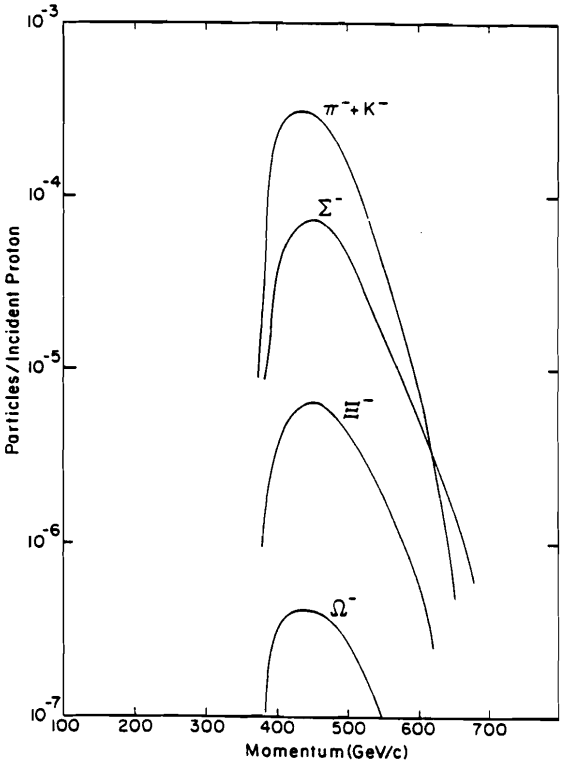


Figure 11.

Proton Area: Fluxes in the Proton Center Hyperon Facility.

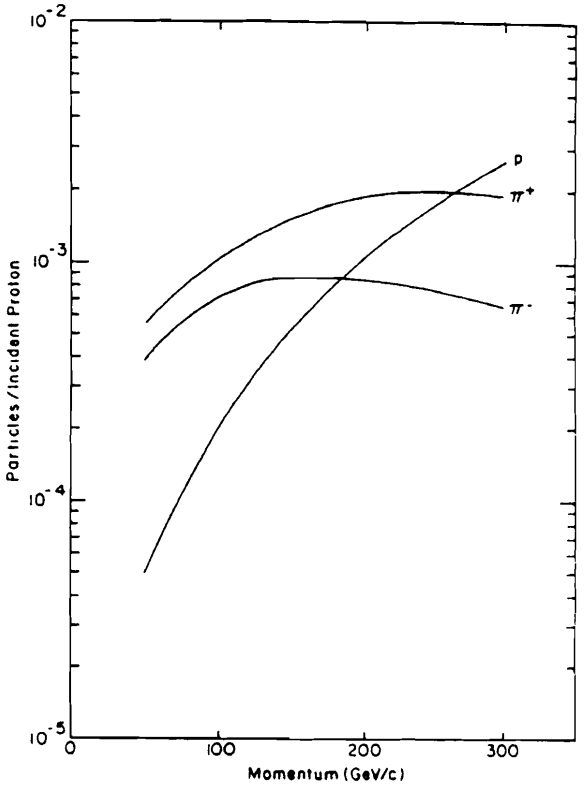


Figure 12.

Proton Area: Proton West High Intensity Laboratory particle flux.

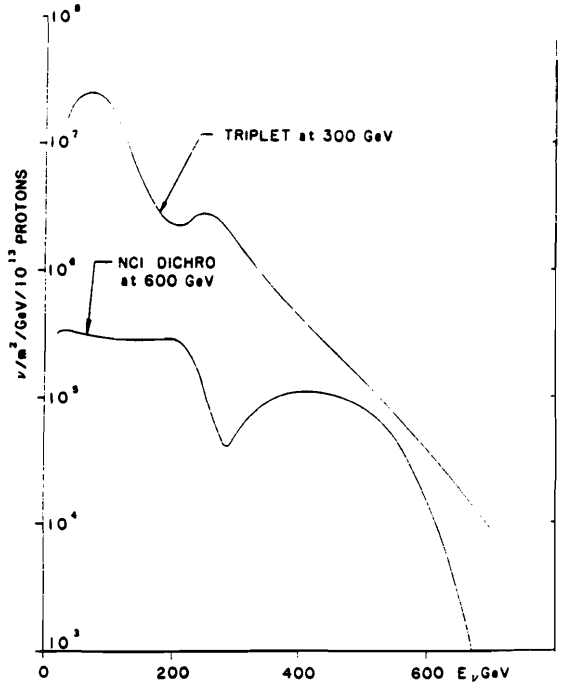


Figure 13.

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

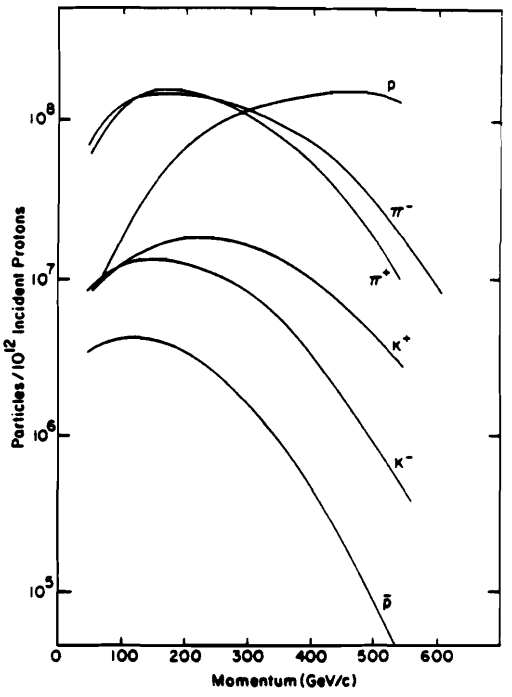


Figure 14.

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

In view of the crucial impact of the availability of computing resources on physics output, we include here some information on recent Fermilab computing availability and usage.

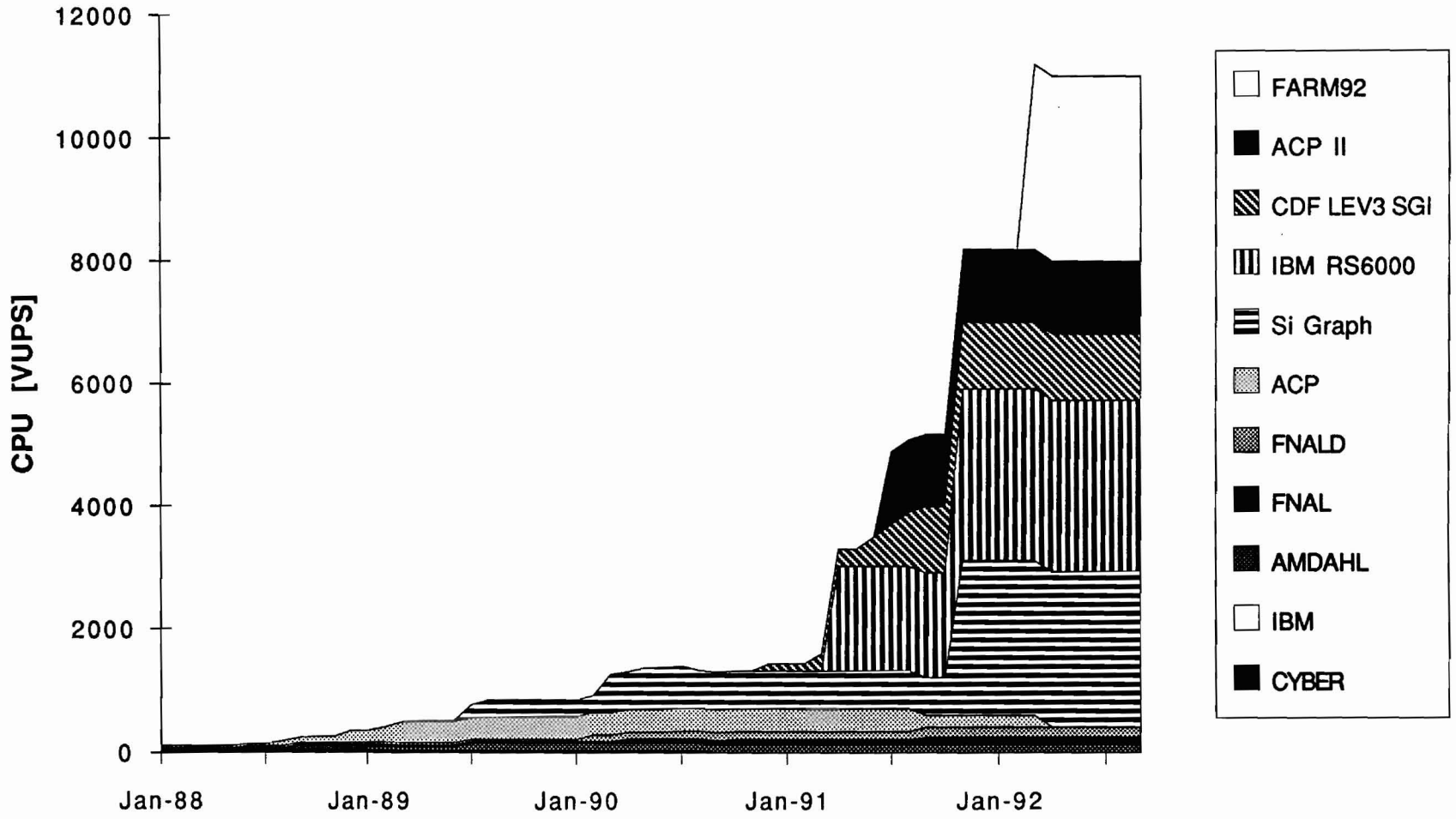


Figure 15. Available Fermilab computing 1988-1992 (Vax equivalents).

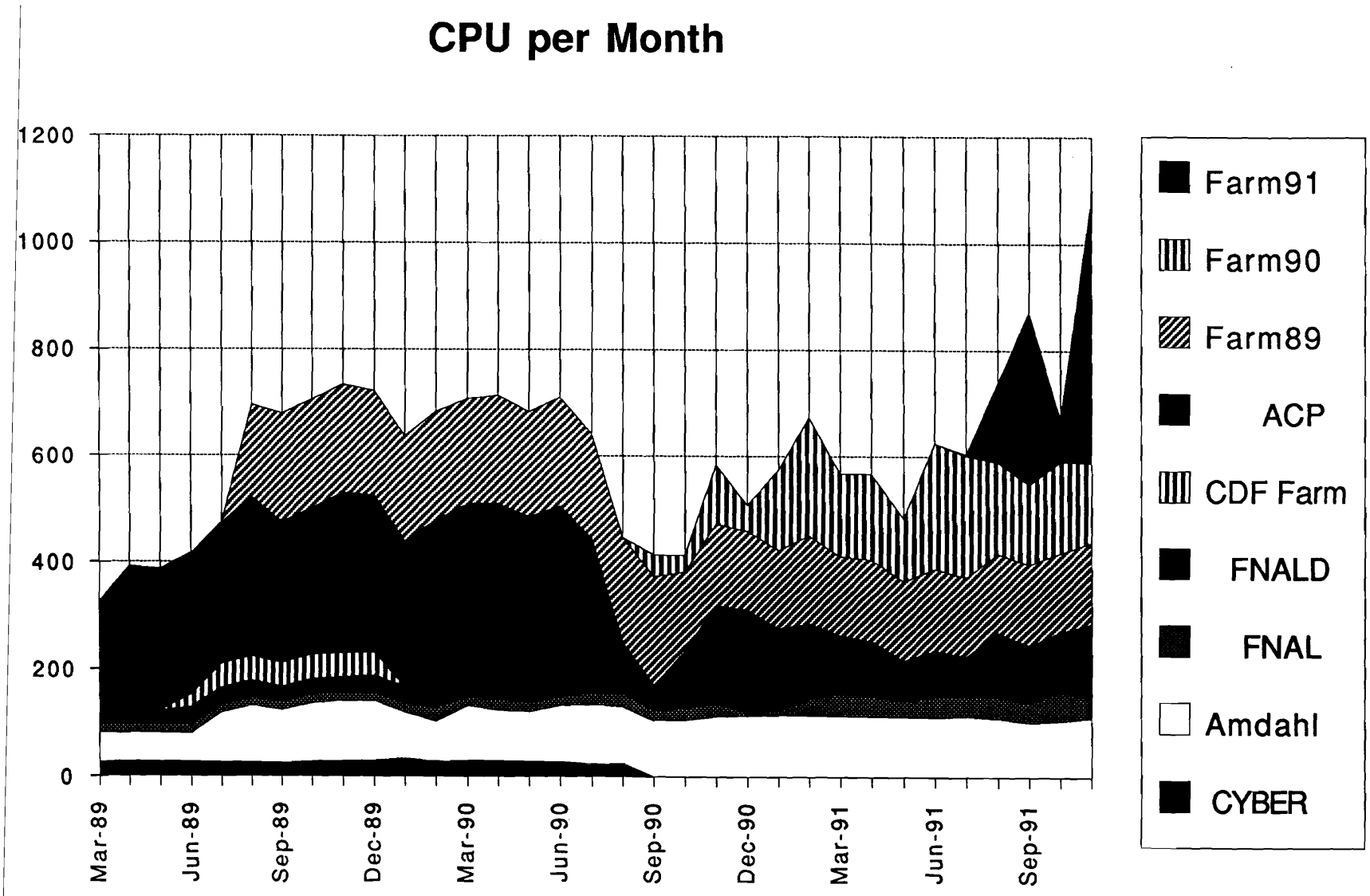


Figure 16. Fermilab computing usage (Vax equivalents).

SECTION V. MAJOR RESEARCH ACTIVITIES DURING 1991 AND 1992

Information on the Fermilab Research Program during 1991 and early 1992 is given in the following pages. Figure 17 shows when experiments (referred to by their experiment numbers) ran in the various beam lines, while Table 3 describes some of the major research activities in a little more detail.

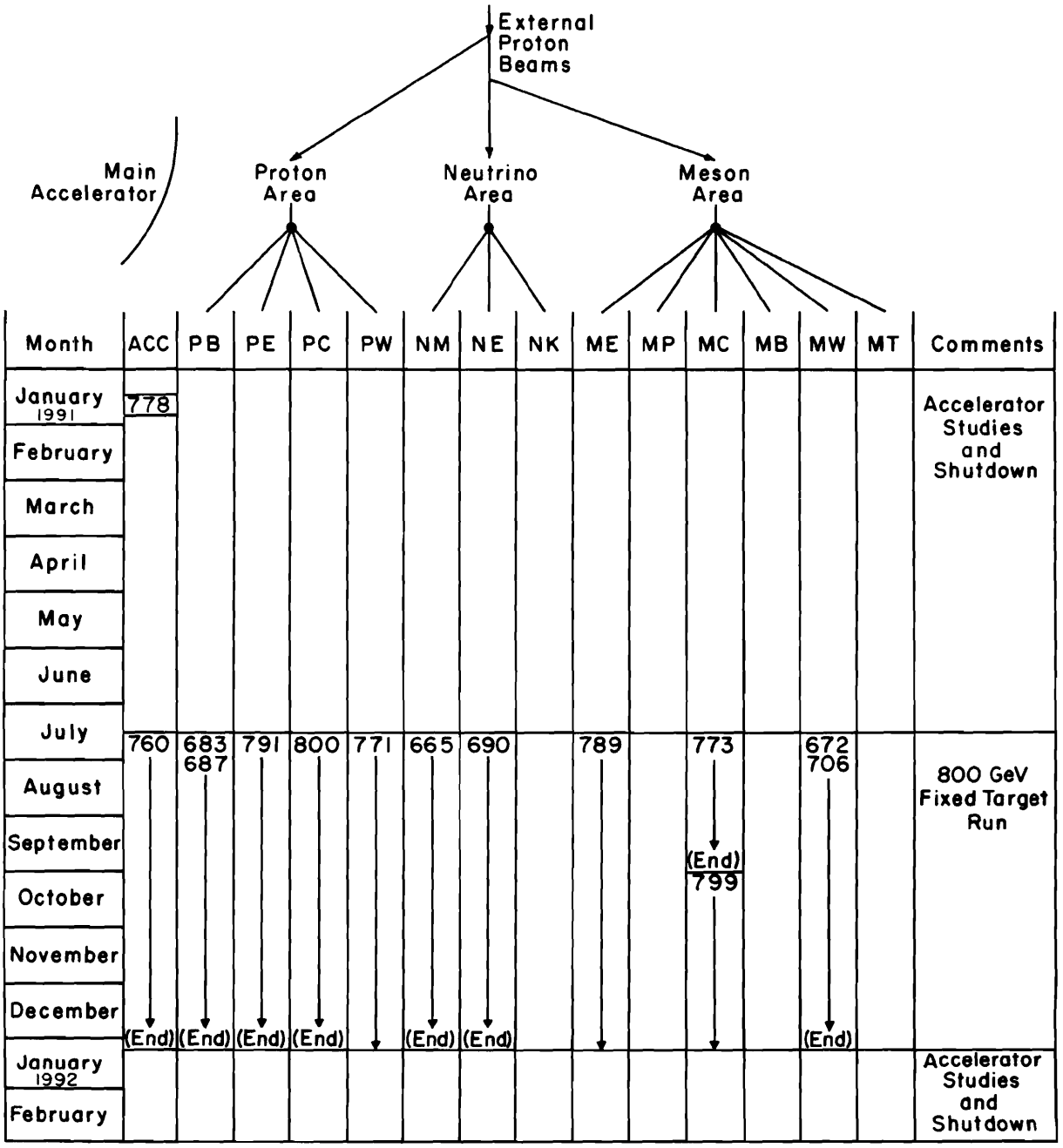


Figure 17. Major experiments running at Fermilab in 1991 and 1992 (through February).

TABLE 3. DESCRIPTION OF MAJOR RESEARCH ACTIVITIES DURING 1991 AND EARLY 1992

Exp. #	
	ACCUMULATOR
760	Charmonium states - data-taking; completed
	PROTON AREA
683	Photoproduction of high p_t jets - data-taking; completed
687	Photoproduction in broad band beam - data-taking; completed
771	Beauty production by protons - setup and data-taking
791	Hadroproduction of charm and beauty - data-taking; completed
800	Ω^- magnetic moment - setup and data-taking; completed
	NEUTRINO AREA
665	Muon scattering - data-taking; completed
690	Study of charm and bottom production - setup and data-taking; completed
	MESON AREA
672	Hadron production of particles in association with ψ and high mass muon pairs - data-taking; completed
706	Direct photon production by hadrons - data-taking; completed
773	η_{oo}, η_{+-} phase difference - setup and data-taking; completed
789	B-quark mesons and baryons - setup and data-taking
799	Search for $K_L^o \rightarrow \pi^o e^+ e^-$ - 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 pages 30-31 is a summary of the current status of approved proposals. Figure 18, based on the Situation Report, illustrates by beam line the major approved experiments not yet completed by the beginning of 1992.

Fermi National Accelerator Laboratory

Experimental Program Situation Report as of January 22, 1992

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 January 22, 1992 . 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 - 404

Beam Area & Line		Experiment	Spokesperson(s)	
(Only experiments which have completed data taking since January 1, 1990 are listed.)				
A. Experiments that have completed data taking (384)				**Completed**
MA	MP	POLARIZED BEAM #704	Yokosawa	Aug 13, 1990
		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
		DIAMOND RADIATION DETECTOR TEST #850	Franklin	Jan 8, 1992
	MW	HADRON JETS #672A	Zieminski	Jan 8, 1992
		DIRECT PHOTON PRODUCTION #706	Slattery	Jan 8, 1992
NA	NK	MUONS IN 1M BUBBLE CHAMBER #782	Kitagaki	Jul 21, 1990
	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
		SILICON STRIP DETECTOR TEST #817	Alexander	Aug 15, 1990
		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	CALORIMETER FOR ZEUS #790	Sciulli	Aug 27, 1990
		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	EMULSION/PI- @ 500 #667	Wolter	Aug 27, 1990
		HADROPRODUCTION HEAVY FLAVORS #791	Appel, Purohit	Jan 8, 1992
		FINE-GRAINED ELECTROMAG. CAL. #T797	Gustafson, Thun	May 20, 1990
		SSC DETECTOR TEST #T798	Cushman, Rusack	May 2, 1990
		WARM HEAVY LIQUID CALORIMETRY #T807	Teige	May 1, 1990
	PB	PHOTOPRODUCTION OF JETS #683	Corcoran	Jan 8, 1992
		PHOTOPRODUCTION OF CHARM AND B #687	Butler, Cumalat	Jan 8, 1992
		ELECTRON BEAM DUMP #774	Crisler	Aug 27, 1990
		RADIATION EXPOSURE #842	Underwood	Jan 8, 1992
	PC	HYPERON RADIATIVE DECAY #761	Vorobyov	Aug 27, 1990
		MAGNETIC MOMENT #800	Johns, Rameika	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
ACCUM	RING	CHARMONIUM STATES #760	Cester	Jan 10, 1992
B. Experiments that are in progress (3)				**Recent Run**
MA	ME	B-QUARK MESONS & BARYONS #789	Kaplan, Peng	Jan 8, 1992
	MC	CP VIOLATION #799	Wah, Yamanaka	Jan 8, 1992
PA	PW	BEAUTY PRODUCTION BY PROTONS #771	Cox	Jan 8, 1992
D. Experiments that are being installed (2)				
COL	B-0	CDF UPGRADE #775	Shochet, Tollestrup	
	D-0	D-0 DETECTOR #740	Grannis	
F. Other approved experiments (5)				
PA	PC	LARGE-X BARYON SPECTROMETER#781	Russ	
	OTHER	EMULSION EXPOSURE 1000 GeV #793	Lord	
COL	B-0	CDF UPGRADE #830	Shochet, Tollestrup	
	D-0	D-0 DETECTOR UPGRADE #823	Grannis	
UNSPEC	BEAM	BOTTOM AT THE COLLIDER #784	Lockyer	

Fermi National Accelerator Laboratory
Experimental Program Situation Report as of January 22, 1992

(continued)

Beam	Area & Line	Experiment	Spokesperson(s)
Pending proposals (38)			
MA	MP	POLARIZED BEAM #682	Underwood
		POLARIZED BEAM #688	Ditzler
		POLARIZED BEAM #699	Stanek
		DIRECT PHOTON SPIN DEPENDENCE #809	Masaike, Nurushev
	MC	CP VIOLATION #832	Hsiung, Winstein
		K-SHORT DECAYS #833	Thomson
	MW	B-PHYSICS #T808	Goldberg
		DIRECT PHOTON #834	Slattery
		FRACTIONAL CHARGE IMPURITIES #846	Perera
NA	NC	NEUTRINO OSCILLATIONS #788	Bernstein
		NEUTRINO #815	Shaevitz
	NM	STRUCTURE FUNCTIONS #810	Wilson
PA	PE	HEAVY FLAVORS AT TPL #829	Appel, Purohit
	PB	HEAVY QUARK PHOTOPRODUCTION #831	Cumalat
	PC	CP VIOLATION #796	Thomson
		PRIMAKOFF PRODUCTION #814	Chaloupka
		HYPERON MEASUREMENTS #826	Johns, Ramcika
COL	C-0	TEVATRON BEAUTY FACTORY #783	Reay
		TEVATRON CRYSTAL EXTRACTION #853	Murphy
	E-0	PBAR P ELASTIC SCATTERING #811	Orear
DBNCHR	RING	MUON FLUXES IN THE DEBUNCHER #854	Bross
		SEARCH FOR NEUTRINO OSCILLATIONS#860	Lee
ACCUM	RING	CPT AND GRAVITY TESTS #812	Smith
		CHARMONIUM STATES #835	Cester
UNSPEC	BEAM	AXION HELIOSCOPE #794	Van Bibber
		SMALL PHYSICS #813	Jones
		MUON NEUTRINO MAGNETIC MOMENT #820	Giokaris
		SDC PROTOTYPE DETECTORS #825	Bensinger
		EMPACT/TEXAS TEST #837	Marx
		CALORIMETER TEST #847	Sulak
		SPIN-TENSOR #857	Sarycheva
		ELASTIC SCATTERING SPIN EFFECTS #858	Krisch
		CP VIOLATION IN HYPERON DECAY #859	Hsueh
MAIN	INJECTOR	NEUTRINO OSCILLATIONS #803	Reay
		KAON PHYSICS AT MAIN INJECTOR #804	Winstein
		IMB NEUTRINO OSCILLATIONS #805	Gajewski
		SOUDAN NEUTRINO OSCILLATIONS #822	Goodman
		DUMAND NEUTRINO OSCILLATIONS #824	Webster

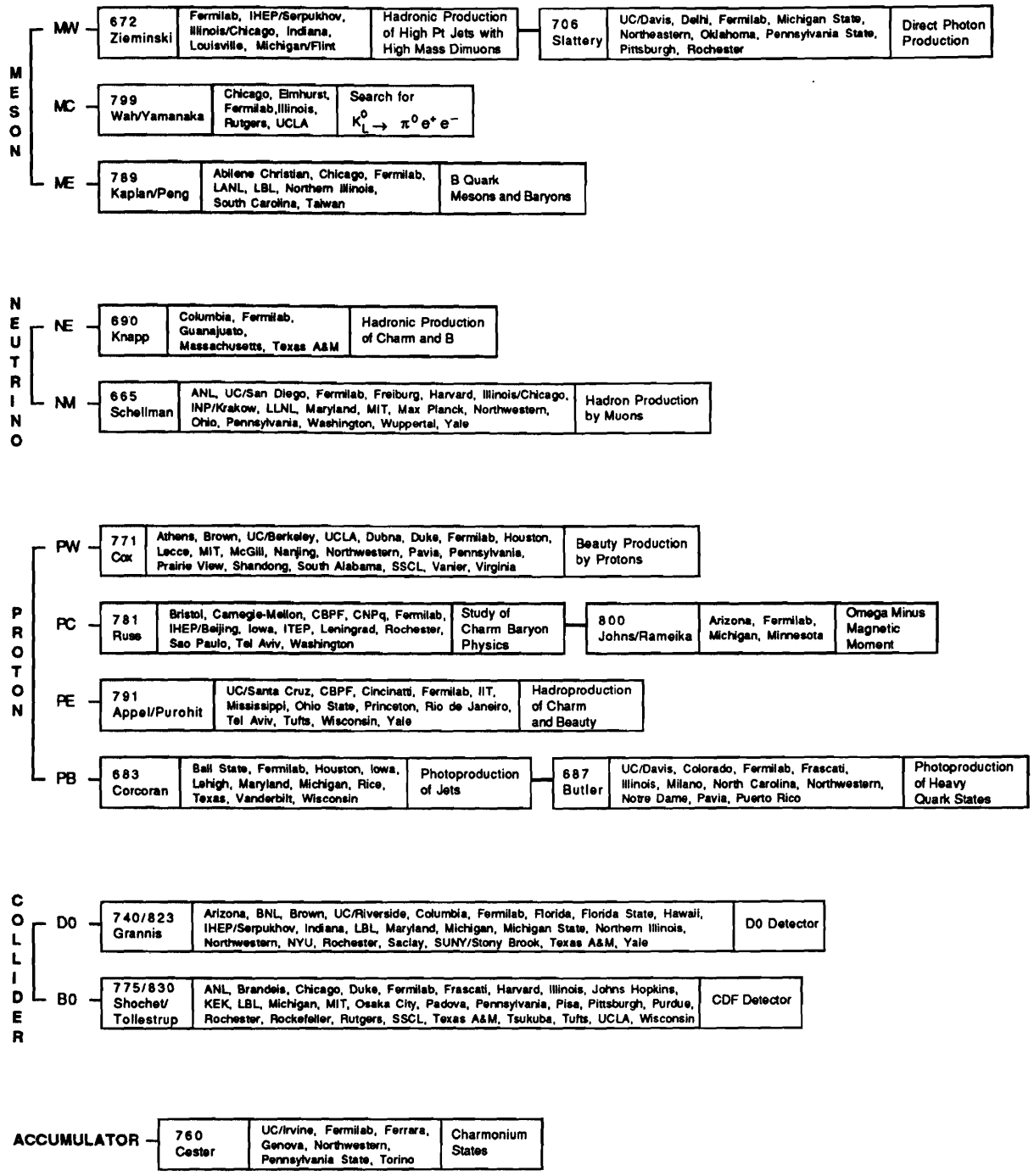
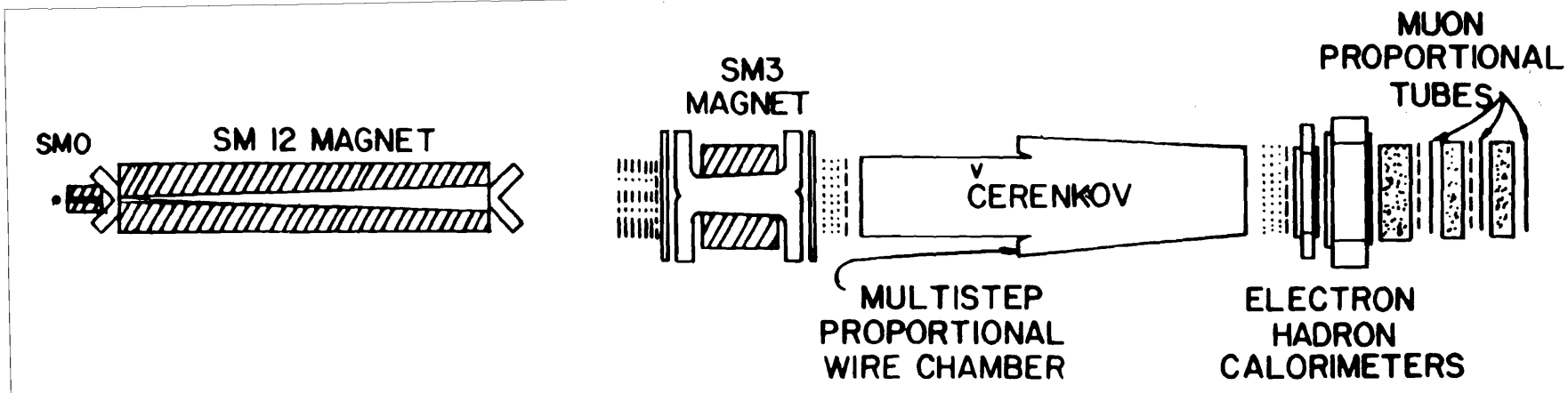


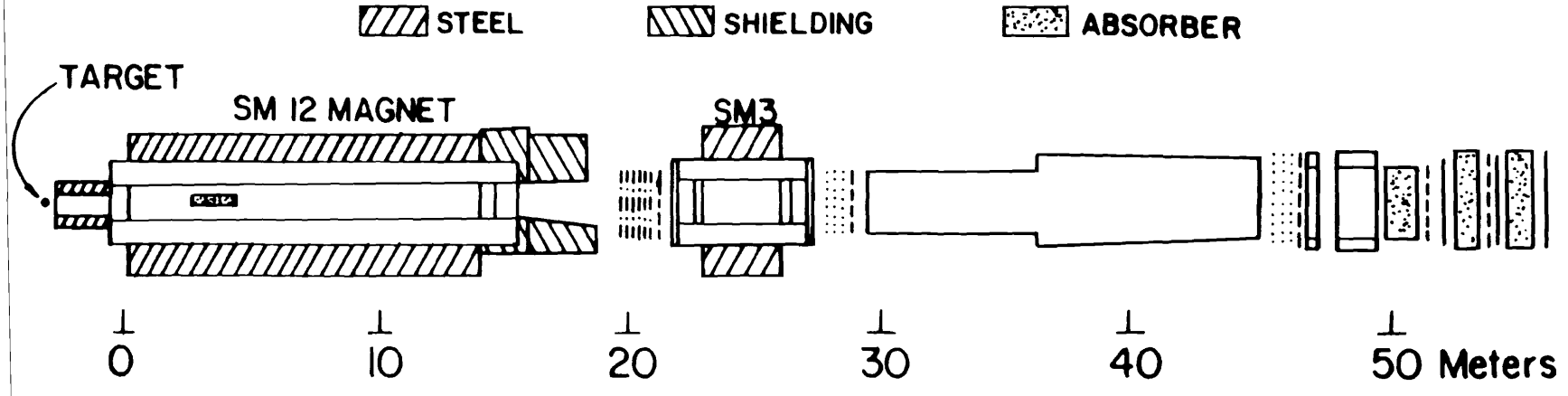
Figure 18. Fermilab experimental program. All major approved experiments not yet completed by the beginning of 1992 are shown here, listed by number, spokesperson, collaborating institutions and a short physics description.

SECTION VII. SUMMARIES OF APPROVED EXPERIMENTS

As in the 1991 Workbook, this Section is expanded considerably from years prior to that. 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. This year, we have decided to not include test beam activities; many are of small size and often occupy a beam line for only a very short time. 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 1992. Meanwhile, the E-605 mass-focussing spectrometer has been modified, used for experiment E-772 in 1987, and continues to be used by experiment E-789 for data-taking in 1990 and 1991.

E-605 Publications

R. W. Fast et al., IEEE Trans. Magnetics MAG-17, 1903 (1981), "14.4 m Large Aperture Analysis Magnet with Aluminum Coils."

J. Hanson et al., IEEE Trans. Nucl. Sci. NS-28, 514 (1981), "A Study of Some Properties Which Determine the Resolution of a Lead-Scintillator Sandwich Electromagnetic Shower Detector."

Y. Sakai et al., IEEE Trans. Nucl. Sci. NS-28, 528 (1981), "Longitudinal Shower Development in a Lead-Scintillator Calorimeter as a Tool to Separate Pions and Electrons at 10-50 GeV Energies."

G. Coutrakon et al., IEEE Trans. Nucl. Sci. NS-29, 323 (1982), "Identification of 200 GeV/c Particles Using a Ring-Imaging Cherenkov Detector."

R. Bouclier et al., Nucl. Instrum. Methods 205, 403 (1983), "Progress in Cherenkov Ring Imaging, Part 1."

Ph. Mangeot et al., Nucl. Instrum. Methods 216, 79 (1983), "Progress in Cherenkov Ring Imaging, Part 2."

M. Adams et al., Nucl. Instrum. Methods 217, 237 (1983), "Pi/K/p Identification with a Large-Aperture Ring-Imaging Cherenkov."

H. Glass et al., IEEE Trans. Nucl. Sci. NS-30, 30 (1983), "Construction and Operation of a Large Ring-Imaging Cerenkov Detector."

J. A Crittenden et al., IEEE Trans. Nucl. Sci. NS-31, 1028 (1984), "A Data Acquisition System for Elementary Particle Physics."

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H. Glass et al., IEEE Trans. Nucl. Sci. NS-32, 692 (1985), "Identification of High Transverse-Momentum Hadrons with a Ring-Imaging Cerenkov Counter."

R. Gray and J. P. Rutherfoord, Nucl. Instrum. and Methods, A244, 440 (1986), "A Clocked, Fast-Electronics Trigger for High-Energy Physics."

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J. A. Crittenden et al., Phys. Rev. D34, 2584 (1986), "Inclusive Hadronic Production Cross Sections Measured in Proton-Nucleus Collisions at $\sqrt{s} = 27.4$ GeV."

R.L. McCarthy et al., Nucl. Instr. and Meth. A248, 69 (1986), "Identification of Large-Transverse-Momentum Hadrons Using a Ring-Imaging Cherenkov Counter."

C. N. Brown et al., Phys. Rev. Lett. 57, 2101 (1986), "A New Limit on Axion Production in 800 GeV Hadronic Showers."

D. E. Jaffe et al., Phys. Rev. D38, 1016 (1988), "High-Transverse-Momentum Hadron-Hadron Correlations in $\sqrt{s}$ = 38.8 GeV Proton-Proton Interactions."

Robert E. Plaag and J. P. Rutherfoord, Nucl. Instr. and Meth. A273, 177 (1988), "A Large High-Speed Memory Buffer for High Energy Physics Data."

D. E. Jaffe et al., Phys. Rev. D40, 2777 (1989), "High-Transverse-Momentum Single-Hadron Production in pp and pd Collisions at $\sqrt{s}$ = 27.4 and 38.8 GeV."

T. Yoshida et al., Phys. Rev. D39, 3516 (1989), "High Resolution Measurement of Massive-Dielectron Production in 800-GeV Proton-Beryllium Collisions."

C. N. Brown et al., Phys. Rev. Lett. 63, 2637 (1989), "Dimuon Production in 800 GeV Proton-Nucleus Collisions."

G. Moreno et al., Phys. Rev. D43, 2815 (1991), "Dimuon Production in Proton-Copper Collisions at $\sqrt{s}$=38.8 GeV."

P. B. Straub et al., Phys. Rev. Lett. 68, 452 (1992), "Nuclear Dependence of High-X_t Hadron and High-Tau Hadron Pair Production in p-A Inteactions at $\sqrt{s}$=38.8 GeV"

E-605 Articles Currently in Preparation

P. B. Straub et al., submitted to PRL, "Particle Ratios of High-X_t Hadrons in p-A Interactions at $\sqrt{s}$=38.8 GeV."

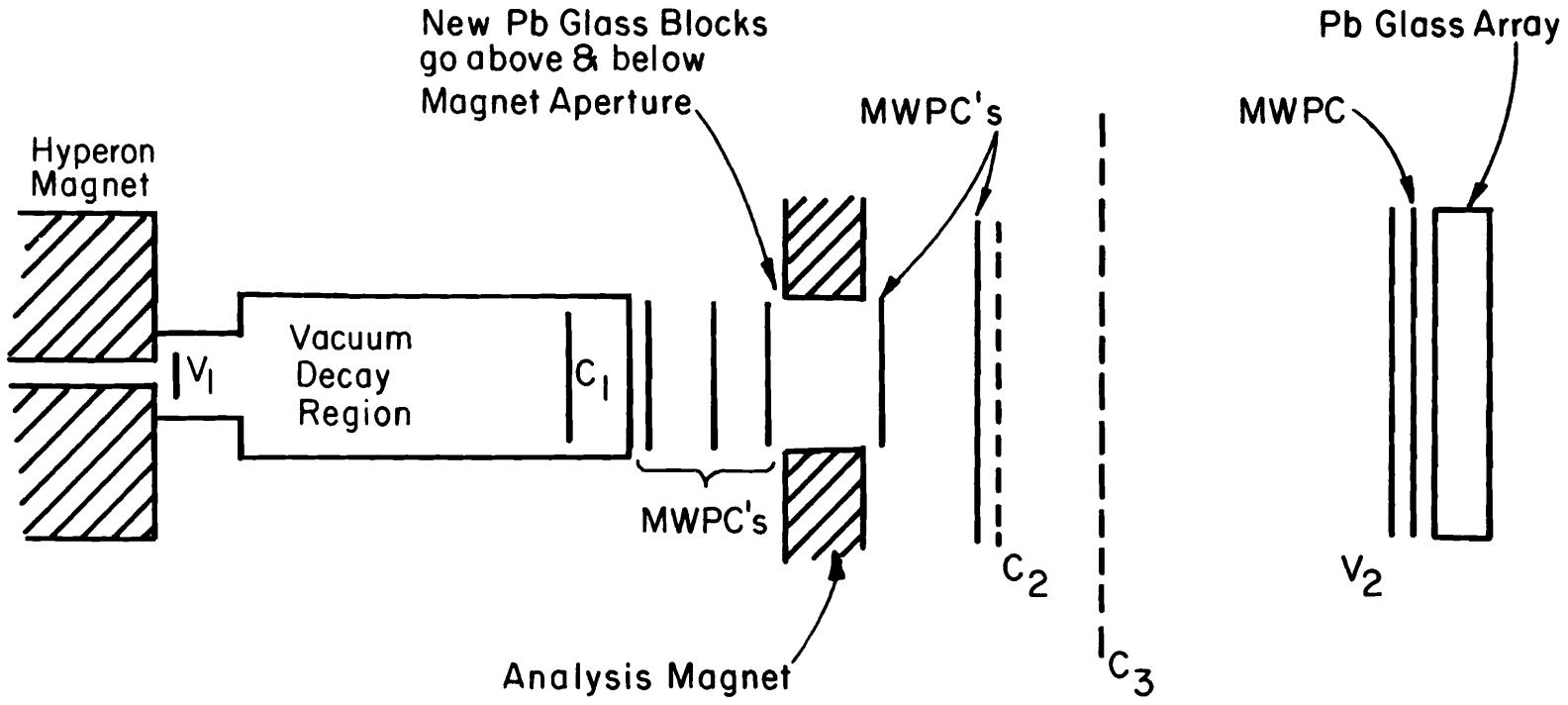
P. B. Straub et al., to be published in PRD, "High-P_t Particle Production and Dihadron Production at 800 GeV."

J. P. Rutherfoord et al., to be published in PRD, "Upsilon Production Dynamics at 800 GeV."

E-605 Theses

George Coutrakon, SUNY Stony Brook
Anna Peisert, Univ. of Geneva
Henry Glass, SUNY Stony Brook
Yoshi Sakai, Kyoto Univ.
Jim Crittenden, Columbia Univ.
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-621


New Pb Glass Blocks
go above & below
Magnet Aperture
MWPC's
Pb Glass Array
MWPC
Hyperon
Magnet
V_1
Vacuum
Decay
Region
C_1
MWPC's
C_2
C_3
V_2
Analysis Magnet

E-621 (Thomson) A Measurement of the CP Violation Parameter η_{+-0}

Michigan, Minnesota, Rutgers

Status: *Data Analysis*

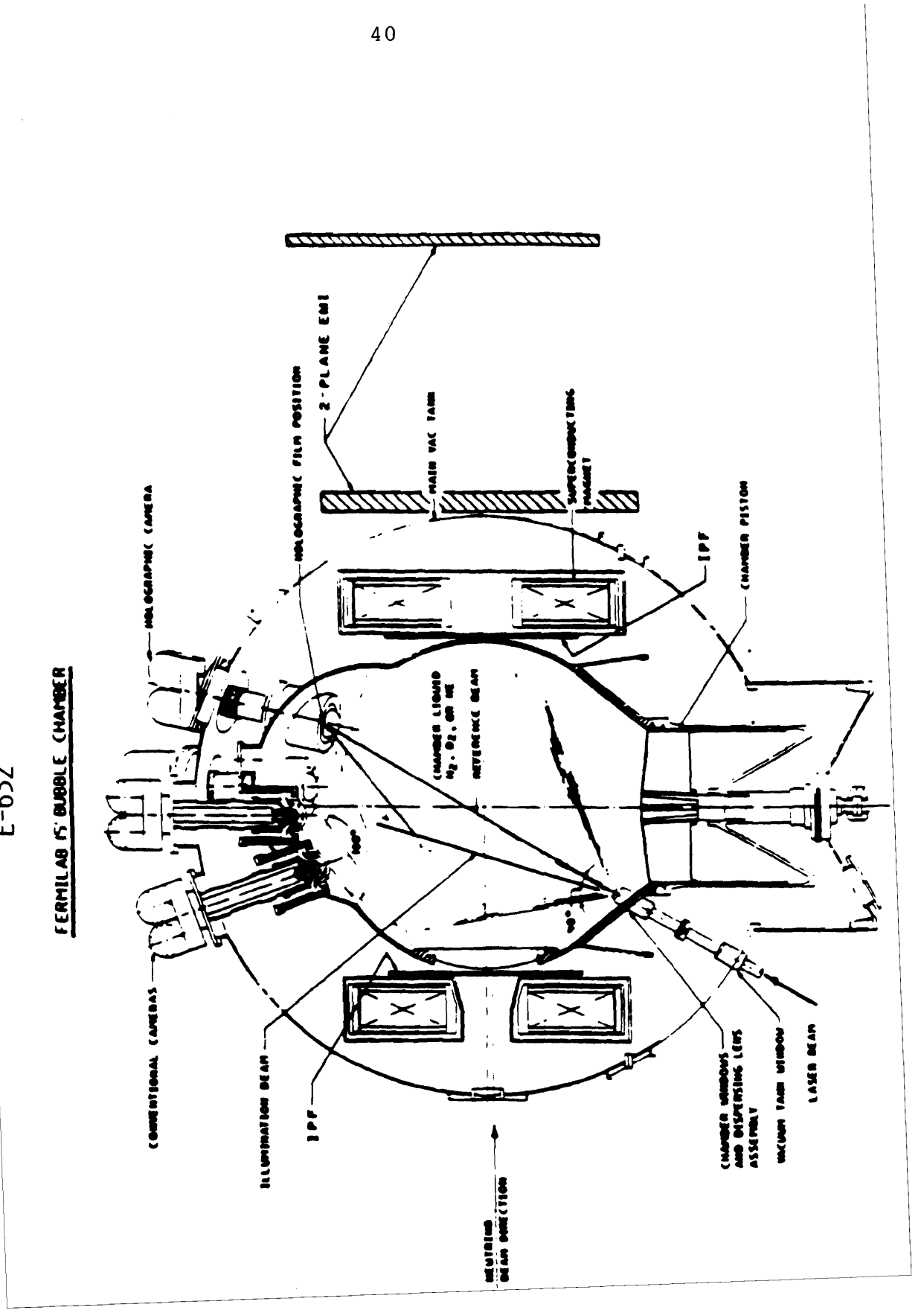
We have proposed to measure η_{+-0} by measuring the interference between K_L^0 and K_L^0 decays to $\pi^+\pi^-\pi^0$ near the kaon production target. This interference is dependent on the proper lifetime of the kaons, so that accurate knowledge of the detector's acceptance, as a function of the longitudinal position of decay vertices, is crucial to the measurement. We want to measure this acceptance by also taking data with a separate target 20 meters upstream of the usual hyperon production target. Then the falling proper lifetime exponential will damp out all contributions to the three pion decay rate except that from the K_L^0. Comparison of observed decays with the exp $(-t/\tau_L)$ K_L^0 behavior will tell us the detector acceptance much more accurately than we could calculate it by Monte Carlo techniques. Using this method we hope ultimately to reach an accuracy of $\sigma(\eta) = .25\ \eta_{+-}$.

The apparatus we used was the Vee spectrometer of the Neutral Hyperon group, with approximately the same configuration as for E-619.

In the latter half of the 1984 running period we carried out a test run, where we collected about 200,000 $K_{\pi 3}$ decays. This data is under analysis and should yield a measurement of η_{+-0} to an accuracy of $\pm.007$. The main portion of our data was collected in the 1985 running period, and is still under analysis.

E-621 Thesis

"Search for CP Symmetry Violation in the 3-Pion Decay Mode of the K-Zero Meson," Nancy Lee Grossman, Thesis, University of Minnesota.


E-632
FERMILAB 15' BUBBLE CHAMBER
HOLOGRAPHIC CAMERA
HOLOGRAPHIC FILM POSITION
2 - PLANE EMI
MAIN VAC TANK
SUPERCONDUCTING MAGNET
IPF
CHAMBER PISTON
CONVENTIONAL CAMERAS
ILLUMINATION BEAM
IPF
CHAMBER WINDOWS AND DEFOCUSING LENS ASSEMBLY
VACUUM TANK WINDOW
LASER BEAM

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.

E-632 Publications 1984 to 1990

H. Bjelkhagen et al., NIM 220, 300 (1984), "Test of High Resolution Two-beam Holography in a Model of the Big European Bubble Chamber."

P. Nailor, Photonics Applied to Nuclear Physics; 2 Nucleophot, Strasbourg (1984) pg. 83, "HOLRED - a Machine to Reproduce and Photograph Real Images from Holograms Taken in the 15-foot Bubble Chamber at Fermilab."

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P. Marage (E-632 Collaboration), Proc. of 12th Intl. Conf. on Neutrino Physics and Astrophysics, Sendai, Japan (1986), "Hadronic Component in Neutrino Interactions."

H. Akbari and H. Bjelkhagen, SPIE 615, 7 (1986) (Society of Photo-Optical Instrumentation Engineers), "Holography in the 15-foot Bubble Chamber at Fermilab."

G. Harigel et al., Applied Optics 25, 4102 (1986), "Pulse Stretching in a Q-switched Ruby Laser for Bubble Chamber Holography."

G. G. Harigel (E-632 Collaboration), NIM A257, 614 (1987), "Holography in the 15-foot Bubble Chamber."

J. K. Hawkins and W. A. Williams, Proc. Intl. Conf. on Lasers - 86, STS Press McLean, VA. (1987) pg. 553, "Laser Pulse Stretching Via Enhanced Closed Loop Control with Slow Q-switching".

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G. Harigel (E-632 Collaboration), NIM A279, 249 (1989), "Holography in the 15-foot Bubble Chamber," also in proc. of Workshop "Physics at UNK" Protvino, 20-24 March 1989.

M. Aderholz et al., NIM A284, 311 (1989), "HOLRED, a Machine for the Replay of Holograms Made in a Large Bubble Chamber."

R. Naon, H. Bjelkhagen, R. Burnstein and L. Voyvodic, NIM A283, 244 (1989) , "A System for Viewing Holograms."

M. Aderholz et al., Phys. Rev. Letters 63, 2349 (1989), "Coherent Production of Pi Mesons by Charged Current Interactions of Neutrinos and Antineutrinos on Neon Nuclei at the Tevatron."

V. Jain et al., Phys. Rev. D41, 2057 (1990), "Di-Muon Production by Neutrinos in the Fermilab 15-foot Bubble Chamber at the Tevatron."

L. Verluyten et al., NIM A292, 313 (1990), "Laser Pulse Stretching Via Enhanced Closed Loop Control with Slow Q-switching."

L. Verluyten et al., NIM A292, 571 (1990), "Monitoring of a High-Powered Ruby Pulsed Laser."

H. Bingham et al., NIM A297, 364 (1990), "Holography of Particle Tracks in the Fermilab 15-foot Bubble Chamber."

E-632 Future Publication

M. Aderholz et al., to be published in Phys. Rev., "Study of High Energy Neutrino Neutral Current Interactions."

E-632 Theses

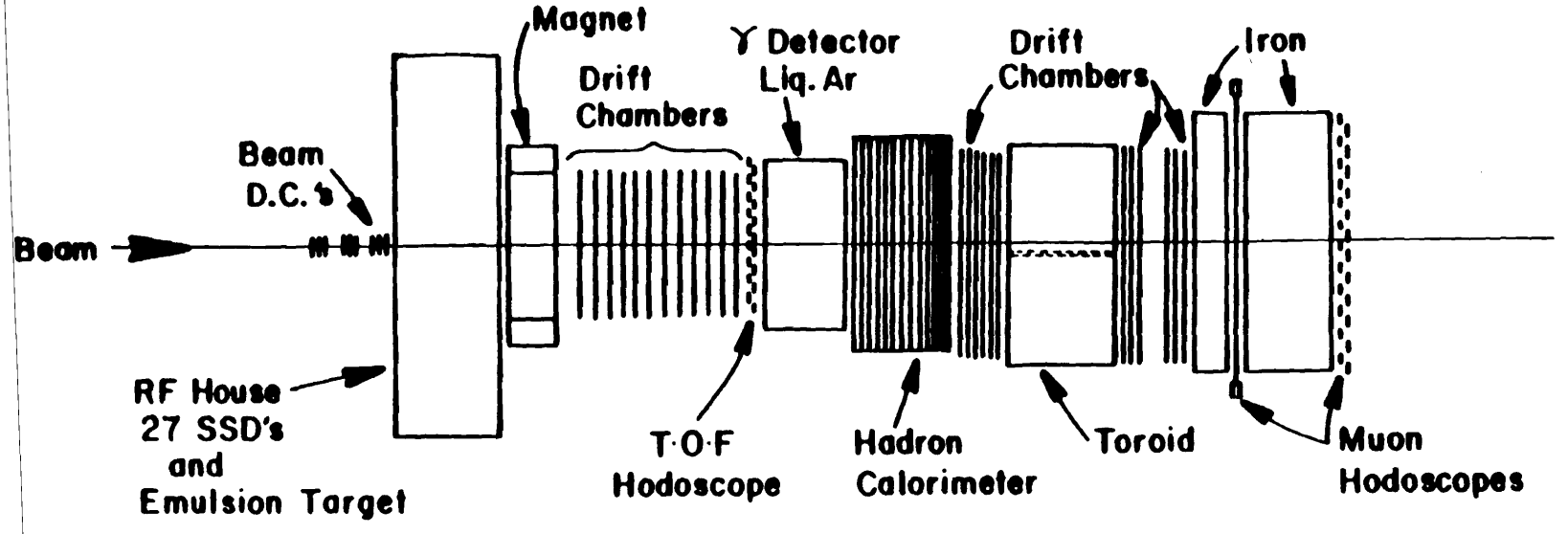
H. Akbari, Tufts University (1987), "High Resolution Imaging of Particle Interactions in a Large Bubble Chamber Using Holographic Techniques."

V. Jain, University of Hawaii (1988), "Di-Muon Production by 0 - 600 GeV Neutrinos in the Fermilab 15-foot Bubble Chamber."

P. R. Nailor, Imperial College, London, (1989), "Holographic Reconstruction of Tracks in Large Volume Bubble Chambers."

Douglas F. DeProspo, Rutgers University, NJ, (1990), "Charged Current Neutral Strange Particle Production in Neutrino-Neon Collisions in the 15-ft Bubble Chamber at the Fermilab Tevatron."

L. Verluyten, Universeit Antwerpen, (1991), "Holography in the FNAL 15-foot Bubble Chamber and Particle Density Fluctuations in Neutrino Interactions."


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) Study of Charm and Beauty Using Hadronic Production in a Hybrid Emulsion Spectrometer

Aichi (Japan), UC/Davis, Carnegie-Mellon, Chonnam National (Korea), Fermilab, Gifu (Japan), Gyeongsang National (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. Inst. (Japan), Toho (Japan), Utsunomiya (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. A measurement of the form factor ratios in $D^+ \rightarrow \overline{K^{*0}}\mu^+\nu$, with errors half as large as earlier work, has been accepted for publication[5], and other topics in charm production and semileptonic decay are being actively pursued both with spectrometer information alone, and with combined spectrometer and emulsion data.

These include a remeasurement of the $D^0 \rightarrow K\mu\nu$ branching fraction with seven times the statistics of Ref. 2, observation of $D_s \rightarrow \phi\mu\nu$, searches for Cabibbo-unfavored semileptonic modes, and measurement of the branching ratio $D_s \rightarrow \tau\nu$ (one event observed so far). The tagged charm from semileptonic decays, and from the beauty scan, will yield more than 1000 charm pairs for production studies.

A scan of the emulsion for events with muon transverse momentum $p_{T\mu} \geq 1.5$ GeV/c has yielded nine b-pair events, from which separate lifetimes for charged and neutral beauty are being obtained. Papers presenting these lifetime results, and the production properties of b-pairs produced by 600 GeV π^- on emulsion, will appear early in 1992. A second emulsion scan with a reduced $p_{T\mu}$ requirement has so far yielded three more b-pair candidates. The estimated yield from the full data sample is fifteen to twenty b-pairs.

References

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3. K. Kodama et al., Phys. Lett. B263, 573 (1991).

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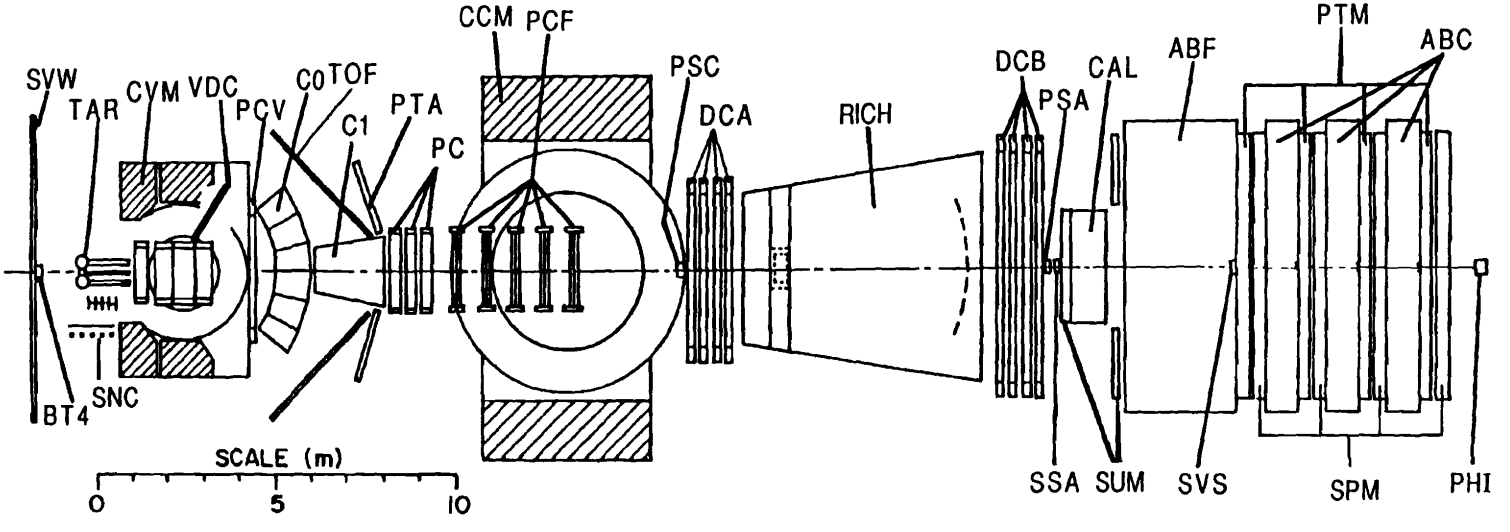
5. K. Kodama et al., Phys. Lett. B (in press, 1991).

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 1991 focussed on continued analysis of the 1987-88 data, systematic studies of the 1990-91 data samples, and the final data-taking run which ended January 8, 1992.

Six students completed their PhD theses in 1991:

Silhacen Aid, University of Maryland, Measurement of the Ratio of Neutron Cross Section to Proton Cross Section in Muon Deep Inelastic Scattering at 490 GeV/c.

Anwar Bhatti, University of Washington, The Ratio of the Proton and Neutron Structure Functions in 90 GeV/c Deep Inelastic Muon Scattering.

Uwe Ecker, Wuppertal, Distributions of Charged Hadrons Observed in Deep Inelastic Muon-Deuterium Scattering at 490 GeV.

Douglas Jansen, University of Washington, Transverse Momentum and the Energy Flow of Charged Hadrons Produced in 490 GeV/c Deep Inelastic Muon Scattering.

Arnd Roser, Wuppertal, Hadron Multiplicities in Deep Inelastic Muon-Nucleon Scattering with a Maximum Center of Mass Energy of 30 GeV.

Michael Schmitt, Harvard University, Deep Inelastic Exclusive ρ^0 Production using 485 GeV Muons.

A typical result showing the extended kinematic range of this experiment is shown in the figure, which displays the x_{Bj} dependence of the ratio of the deep inelastic cross sections of xenon to deuterium, compared to previous results from CERN.

The 1990/91 runs accumulated data with an order of magnitude more statistics at low x compared to the figure and with better control of the relative systematic errors by frequent interchange of the targets.

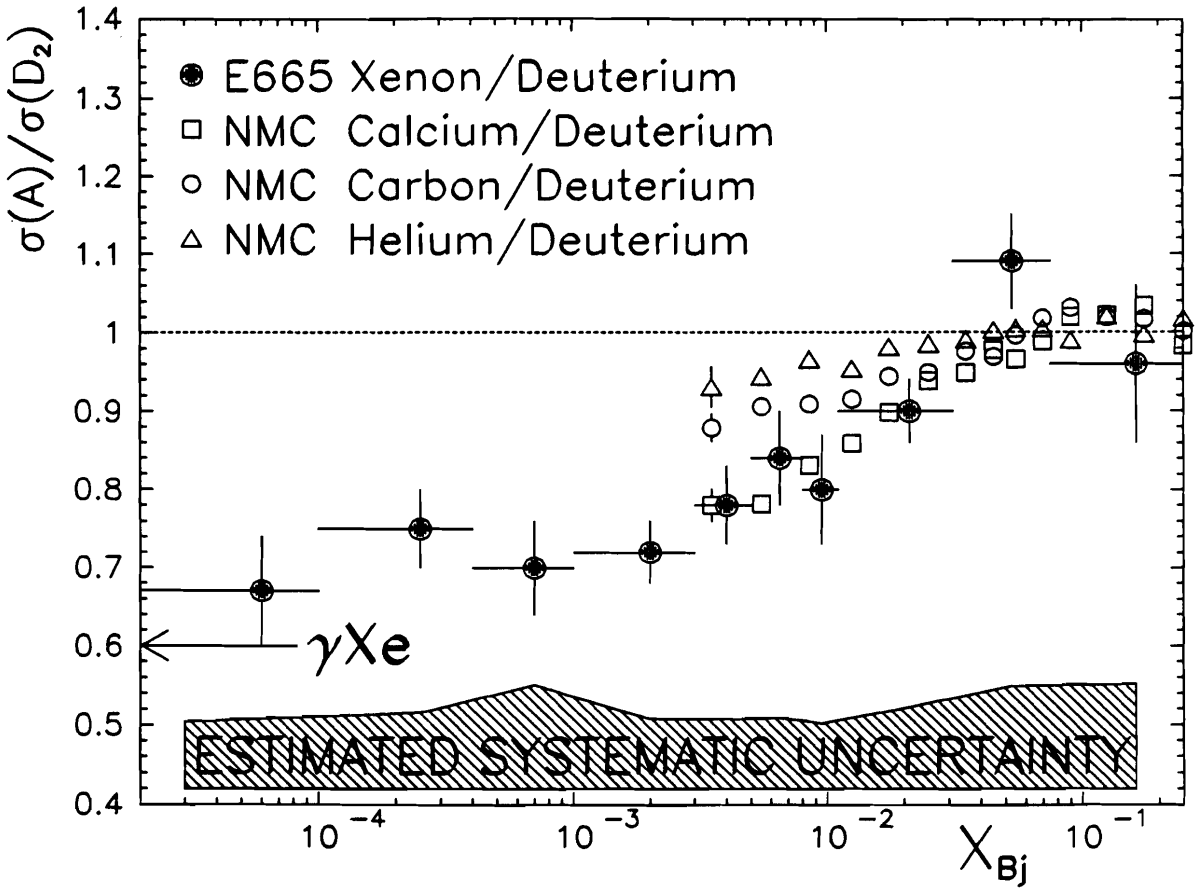


Figure 1. The x_{Bj} dependence of the xenon/deuterium cross section ratio from this experiment and the calcium/deuterium structure function ratio from the NMC collaboration at CERN. The shaded band indicates the scale of E-665 systematic errors.

E-667 (Wolter) Multiparticle Production in Pion-Nucleus Interactions at 525 GeV

Krakow (Poland), Lebedev (Russia), Louisiana State, Tashkent (Uzbekistan)

Status: *Data Analysis*

This experiment will study the multiparticle production in negative pion-nucleus interactions at the energy of 525 GeV, by means of nuclear emulsion technique.

Until now we have done three emulsion exposures to negative pion beams at Fermilab, namely, E-339, E-574 and E-667 at 200, 300 and 525 GeV respectively. The experimental results from E-339 and E-574 have already been published.

E-667 is an extension of our previous studies to the highest possible negative pion beam energy. We will study a dependence of the charged particle multiplicity and angular distributions of produced particles on the energy of the projectile and the mass number of the target nucleus.

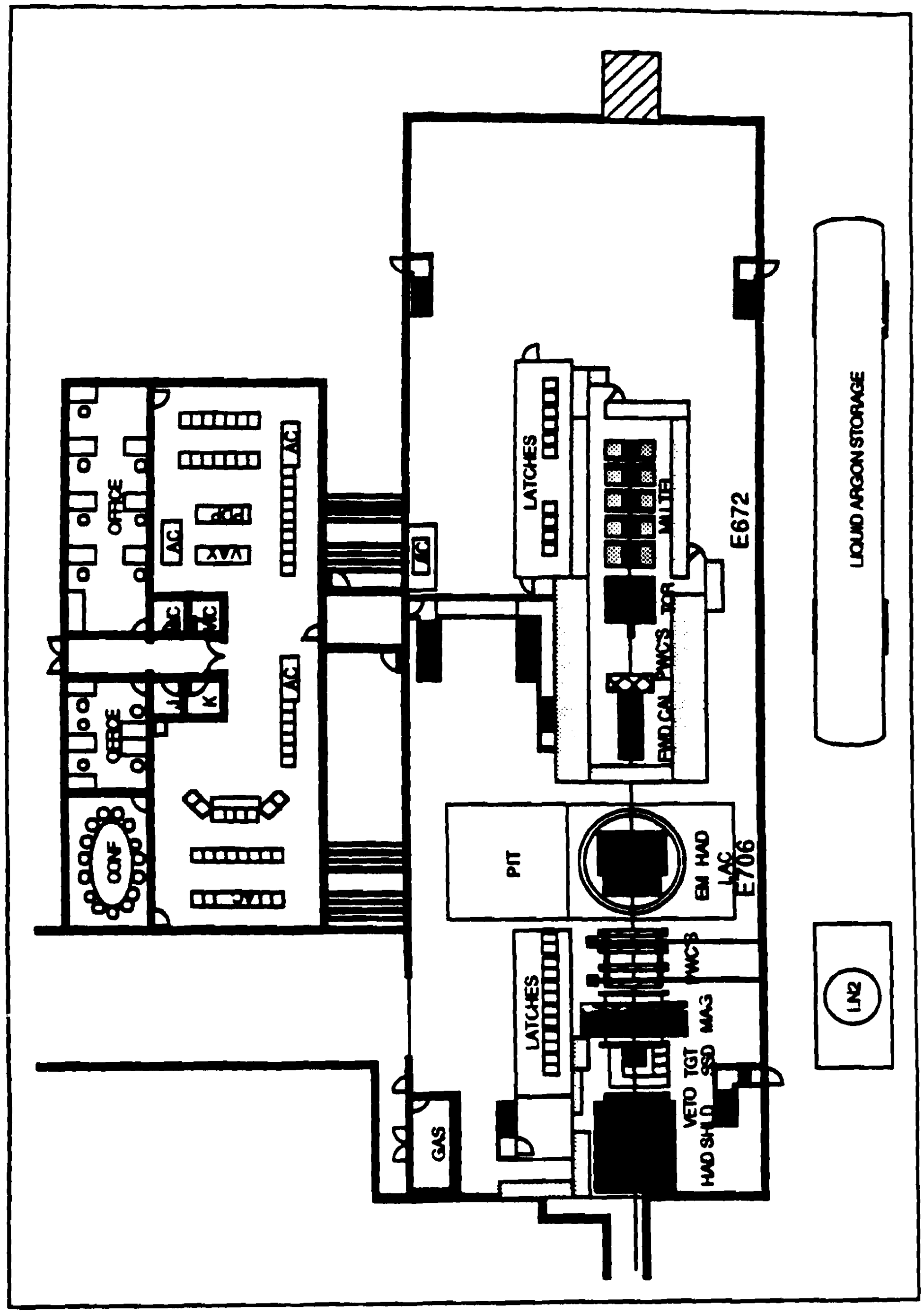
Central collisions of negative pions with the heavy components of nuclear emulsion, i.e. silver and bromine nuclei, will also be studied to determine the characteristics of small impact parameter collisions, and, by comparison with negative pion - nucleon collisions, the dependence of the interaction process on the mean number of intranuclear collisions.

Other phenomena of interest in this experiment include particle correlations and non-statistical fluctuations in pseudorapidity distribution of charged secondary particles.

Total and topological cross-sections for coherent diffractive dissociation of pions on emulsion nuclei will be extracted and the energy dependence of the multiplicity distributions of charged particles in the coherent reactions studied.

In August of 1990 we exposed five nuclear emulsion stacks to the pion beam at the energy of 525 GeV. Emulsion pellicles were oriented parallel to the pion beam. The density of primary pion tracks accumulated by each emulsion stack was about 20000 per square centimeter. The development of emulsion pellicles was done in JINR-Dubna, Russia. We plan to measure about three thousand pion-nucleus interactions, selected under minimum bias conditions in along the primary track scanning.

M WEST SPECTROMETER



E706/E672 LAYOUT

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

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

Status: *Data Analysis*

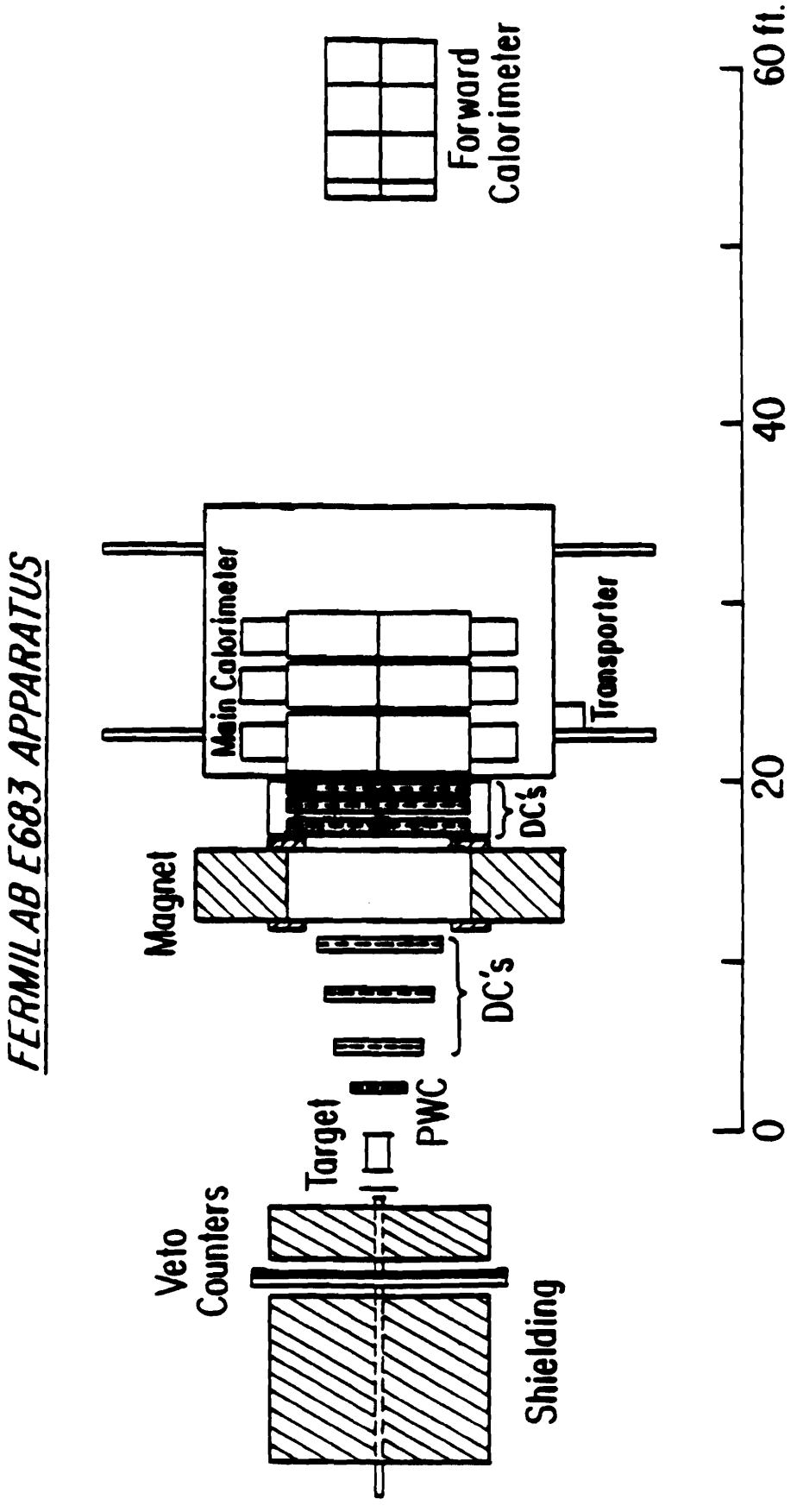
The aim of the E-672 experiment is to study production of particles produced in association with vector mesons (including J/ψ) and high mass dimuon pairs. The experiment shares the MW beam line, magnetic spectrometer and calorimetry with the E-706 experiment. The dimuon detector is located downstream of the forward hadronic calorimeter and consists of a toroid magnet, 6 PWC's with 3 or 4 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 include studies of hadrons and gammas produced in association with dimuons and a study of A-dependence of J/ψ and Drell-Yan pair production with proton and pion beams. Multiplicities and momenta of hadronic particles are measured in almost the entire phase space region and those for photons in the 45° - 135° range of c.m. polar angle. The correlation between dimuon momentum and associated secondaries sets new constraints for understanding mechanisms for dimuon production. In particular single photons observed either as conversion pairs or in the Liquid Argon Calorimeter (LAC) together with J/ψ should provide information on production of χ states. The χ mass resolution is 8 MeV/c^2 for the conversion mode and 25 MeV/c^2 for Eγ > 8 GeV. The silicon strip detector (SSD-E706) is used to search for B→ J/ψ + X decays (we expect one separable B decay per 1500 J/ψ's).

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 D41, 1 (1990)) and another on properties of J/ψ production in π^- Be and pBe collisions at 530 GeV/c (Fermilab-PUB91-62E).

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 of 40 MeV/c^2. 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 $\chi \rightarrow J/\psi + e^+e^-$ decays and several hundreds $\chi \rightarrow J/\psi + \gamma$ decays. A clear separation of the χ (3510) and χ (3555) signals was achieved in the $\chi \rightarrow J/\psi + e^+e^-$ mode.

The last E-672 run was completed in January 1992. We ran with 530 GeV/c and 800 GeV/c protons incident on H, Be and Cu targets. We collected over 8 million triggers. The data quality is comparable to that of the 1990 run.


FERMILAB E683 APPARATUS
Veto Counters
Target
PWC
DC's
Magnet
Main Calorimeter
DC's
Transporter
Shielding
Forward Calorimeter
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 will study 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.

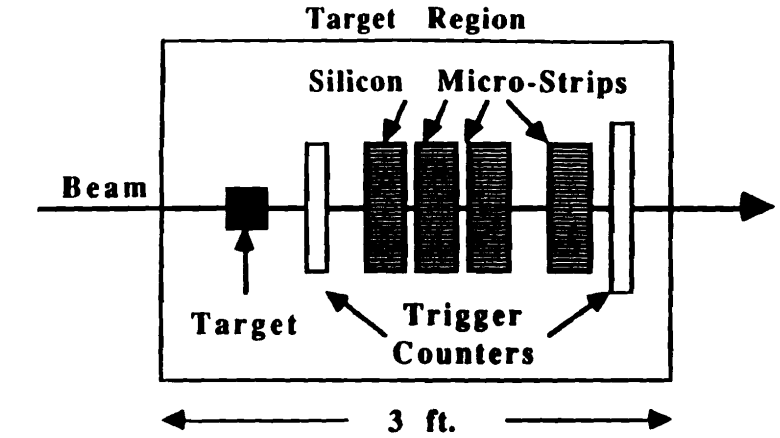
The A-dependence of jet production from nuclei is of interest. The photon can produce partons deep inside a nucleus, allowing one to study the propagation of partons through nuclear matter. A photon beam is a clean probe of such processes. Also, in regions where the Compton diagram dominates, differences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

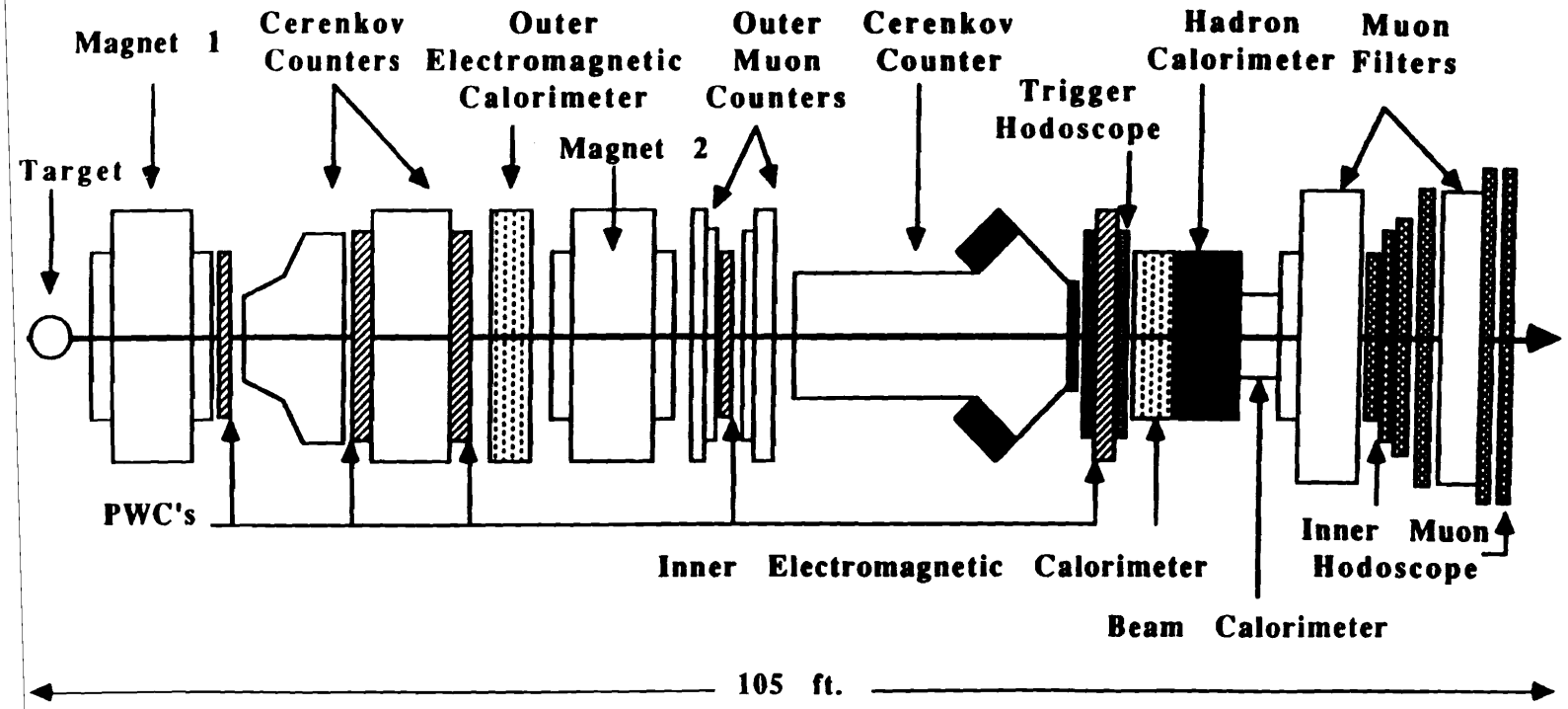
Photons in the momentum range 200 to 500 GeV/c will be tagged with a momentum uncertainty of about 2%. A plan view of the apparatus is shown in the accompanying figure. It consists of a wide-angle magnetic spectrometer, the main calorimeter array, and a forward calorimeter. The spectrometer is comprised 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. An electromagnetic shower detector (not shown) will be added to distinguish between single photons and π^0's. The forward calorimeter will measure the energy flow in the region from $\theta_{cm} = 0^o$ to about 30^o. 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. By mid-November, we had collected 10 million high-p_t triggers using hydrogen, deuterium, and a range of nuclear targets. Preliminary analysis indicates that about 30,000 dijet events with average p_t greater than 4 GeV have been collected from the hydrogen target, and approximately the same amount from nuclear targets. Data-taking was completed in early January 1992.


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
Target
Magnet 2
Trigger Hodoscope
PWC's
Inner Electromagnetic Calorimeter
Inner Muon Hodoscope
Beam Calorimeter
105 ft.

E-687 (Butler) Photoproduction of Charm and B

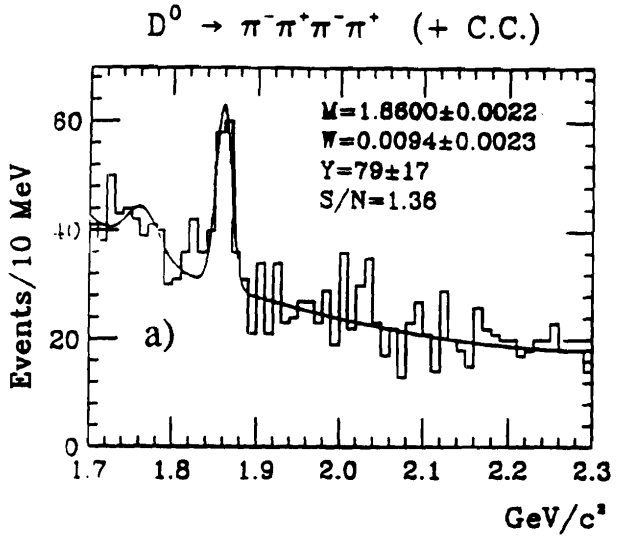
INFN/Bologna (Italy), UC/Davis, Colorado, Fermilab, Illinois, INFN/Frascati (Italy), Korea (Korea), INFN/Milano (Italy), Milano (Italy), North Carolina, Northwestern, Notre Dame, Pavia (Italy), Puerto Rico/Mayaguez, South Carolina, Tennessee, Western Kentucky, Vanderbilt

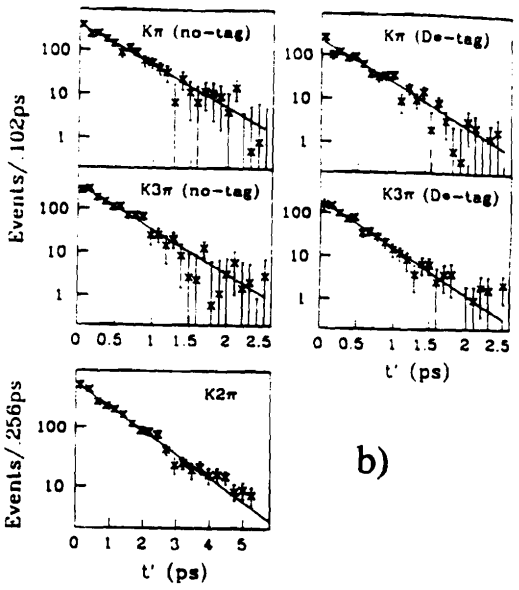
Status: *Data Analysis*

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" x 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.

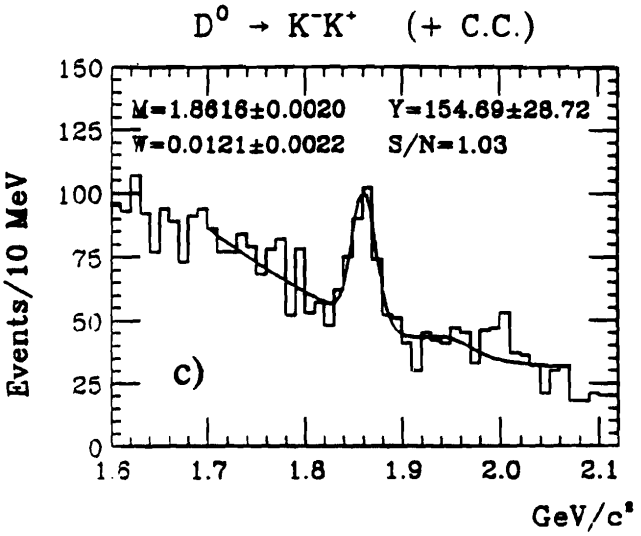
In the first run of the experiment, in 1987/88, over 70 million events were collected. These are now being analyzed. Examples of charm signals from this running period are shown in the accompanying figure. For the 1990 run, a beam tagging system was installed which measured the incident electron energy 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 should contain more than 10^5 fully reconstructed examples of charm decay.

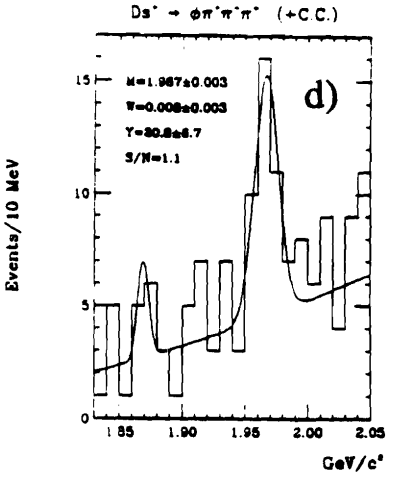
Results on lifetimes and rare charm decays have already been published. In the figure we show from the 1987/88 data signals for rare decays of D mesons (a, c, d), the time evolution of D mesons (b), and a rare decay of D_s (d). A signal of 15,000 D mesons is shown in e, reconstructed from about 1/7 of the 1990/1991 data with very loose cuts so that more background has entered the plots than will appear in the final result.

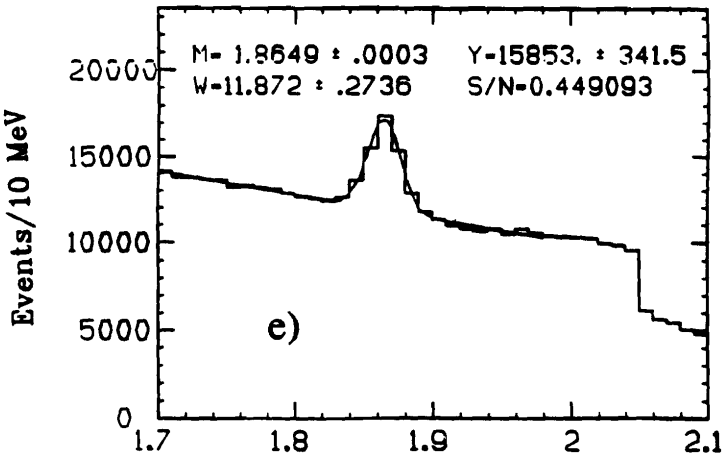




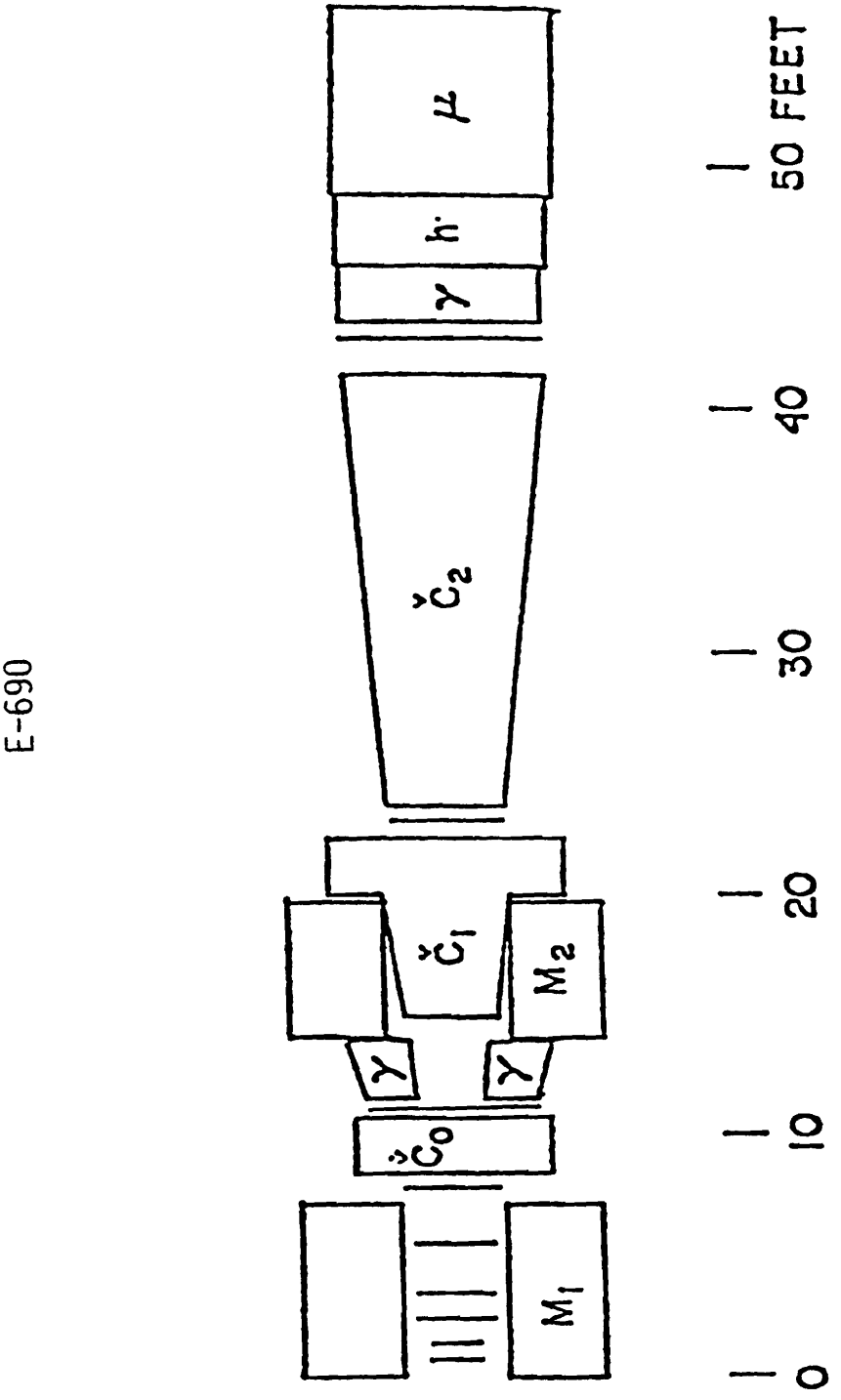
Lifetime evolution measured for the five charm samples.







Signal of 15,000 events from 1/7 of data from 1990/91 run. Sum of $D^0 \to K\pi, K3\pi$ and $D^+ \to K2\pi$. (very loose cuts)


E-690
μ
h
γ
Č2
Č1
M2
γ
γ
Č0
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*

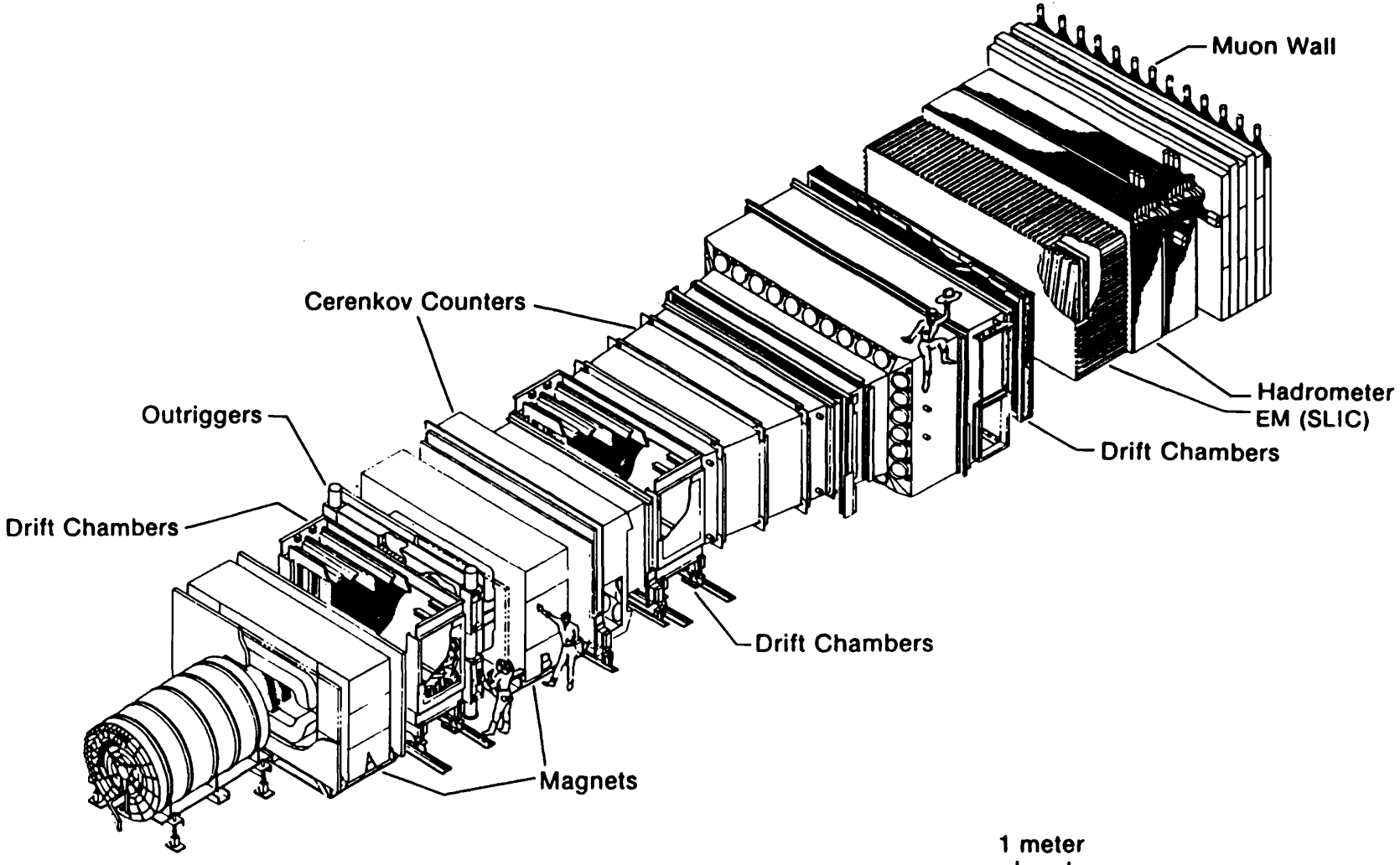
The primary purpose of this experiment is a detailed accurate study of the production and decay of charm and bottom particles. We will concentrate on fully reconstructed events, for which all final state particles have been accurately reconstructed. We observe a wide range of topologies with excellent 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
Recoil Detector
1 meter

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.

E-691 Journal Publications

"Experimental Study of the A Dependence of J/Ψ Photoproduction," M.D. Sokoloff, et al. Phys. Rev. Lett. 57, 3003 (1986).

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

"Measurement of the D_s^+ Lifetimes," J.C. Anjos, et al. Phys. Rev. Lett. 58, 1818 (1987).

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

"Study of D^o-$\bar{D}^o$ Mixing," J.C. Anjos, et al. Phys. Rev. Lett. 60,1239 (1988).

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

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

"Measurement of $D_s^\pm$ and $D^\pm$ Decays to Nonstrange States," J.C. Anjos, et al., Phys. Rev. Lett. 62, 125 (1989).

"Charm Photoproduction," J.C. Anjos, et al., Phys. Rev. Lett. 62, 513 (1989).

"Experimental Study of the Semileptonic Decay $D^+ \rightarrow \bar{K}^{*o}e^+\nu_e$," J.C. Anjos, et al., Phys. Rev. Lett. 62, 722 (1989).

"Study of the Semileptonic Decay Mode $D^o \rightarrow K^-e^+\nu_e$," J.C. Anjos, et al. Phys. Rev. Lett. 62, 1587 (1989).

"Observation of Excited Charmed Mesons," J.C. Anjos, et al. Phys. Rev. Lett. 62, 1717 (1989).

"Observation of $\Sigma_c^0 \rightarrow \Lambda_c^+\pi^-$ Decays," J.C. Anjos, et al. Phys. Rev. Lett. 62, 1721 (1989).

"A Study of $D_s^{\pm}$ and $D^{\pm}$ Decays into Four-Body Final States Including $\eta\pi^{\pm}$ and $\omega\pi^{\pm}$," J.C. Anjos, et al. Phys. Lett. 223, 267 (1989).

"D-Mesons," R. Morrison and M. Witherell, Ann. Rev. of Nuc. & Part. Sci., 39, 183 (1989).

"Study of Decays of the Λ_c^+," J.C. Anjos, et al. Phys. Rev. D41, 801 (1990).

"Study of $D_s^+ \rightarrow \Phi e^+\nu$ and the Absolute $D_s^+ \rightarrow \Phi\pi^+$ Branching Fraction," J. C. Anjos, et al., Phys. Rev. Lett. 64, 2885 (1990).

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

"Photon Gluon Fusion Analysis of Charm Photoproduction," J. C.. Anjos, et al., Phys. Rev. Lett. 65, 2503 (1990).

"Measurement of the Form Factors in $D^+ \rightarrow K^*e\nu$ Decay," J. C. Anjos, et al., Phys. Rev. Lett. 65, 2630 (1990).

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

E-691 Ph.D. 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

E-691 Papers In Publication Process

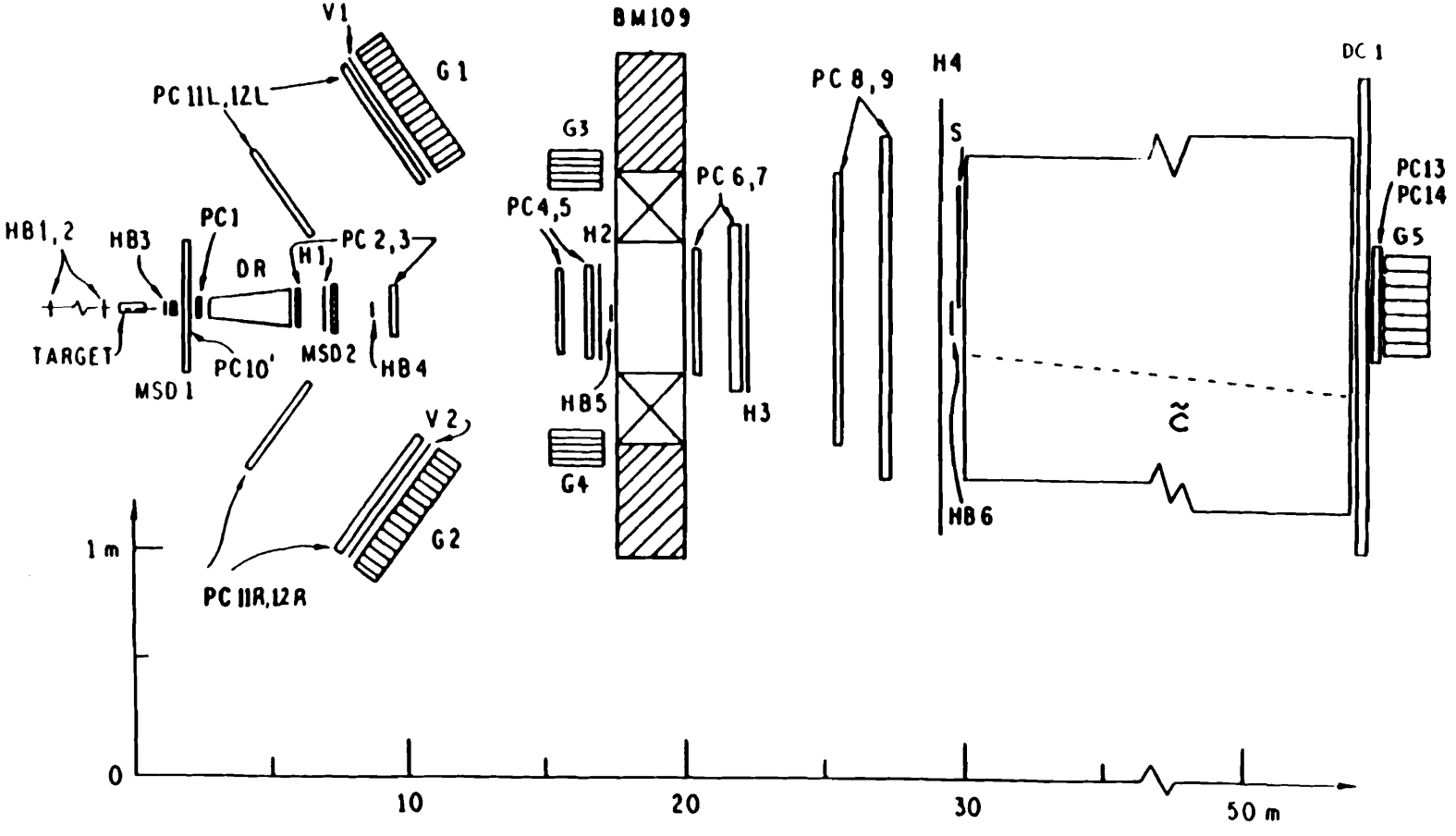
"A Study of the Decay $D_s^+ \rightarrow \eta'\pi^+$" (Phys. Rev. Brief Report).

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

E-691 Conference Papers In Preparation As Articles
(Expected Journal)

"Measurement of the Decay Modes $D^o \rightarrow \pi^+\pi^-$ 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 $D \rightarrow K\pi\pi$ decay modes, photoproduction of charmonium, rare leptonic decay modes, and decays of charmed baryons.


V1
G1
PC 11L, 12L
BM109
G3
PC 8, 9
H4
DC 1
PC 6, 7
PC4, 5
H2
S
PC13
PC14
HB1, 2
HB3
PC1
PC 2, 3
H1
DR
G5
TARGET
PC10'
MSD2
HB4
MSD 1
HB5
H3
V2
G4
HB6
1 m
G2
PC 11R, 12R
0
10
20
30
50 m

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^o, 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 $\Lambda^o(K^o)$ and Σ^o 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^o and Σ^o 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^o-decay. The magnetic spectrometer with proportional and drift chamber systems observed the $\pi^{\pm}$ and Λ^o and Σ^o 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 $\Delta\sigma_L^{Tot}(\bar{p}p)$, $\bar{p}^{\uparrow}p \rightarrow \pi^{\pm}x$,

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

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

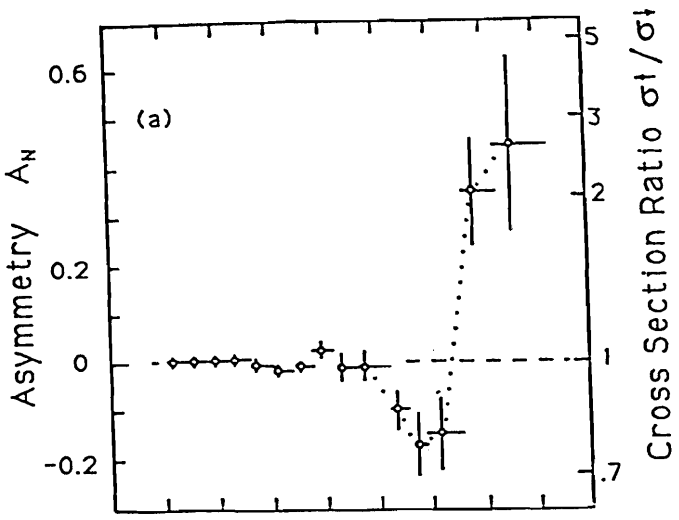
The following data are published, or are to be published in Physics Letters:

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

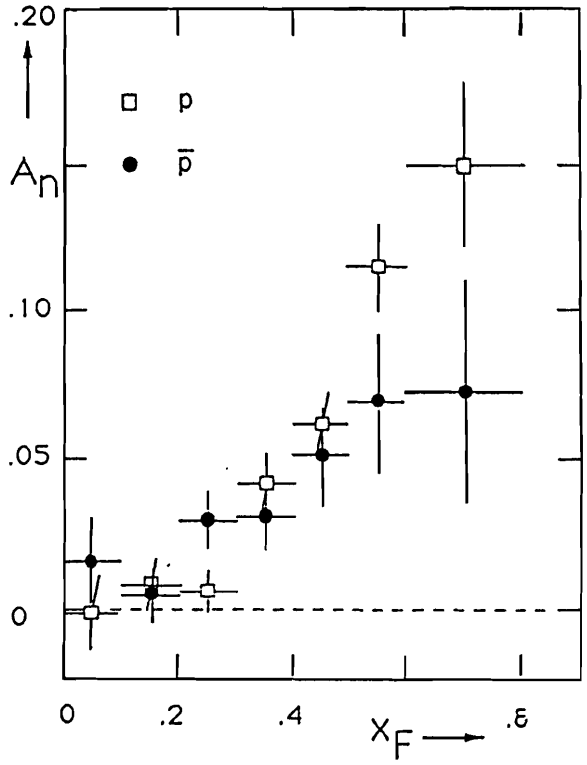
$p^{\uparrow}p \rightarrow (\pi^o, \eta)X$ at $x_F = 0$,

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

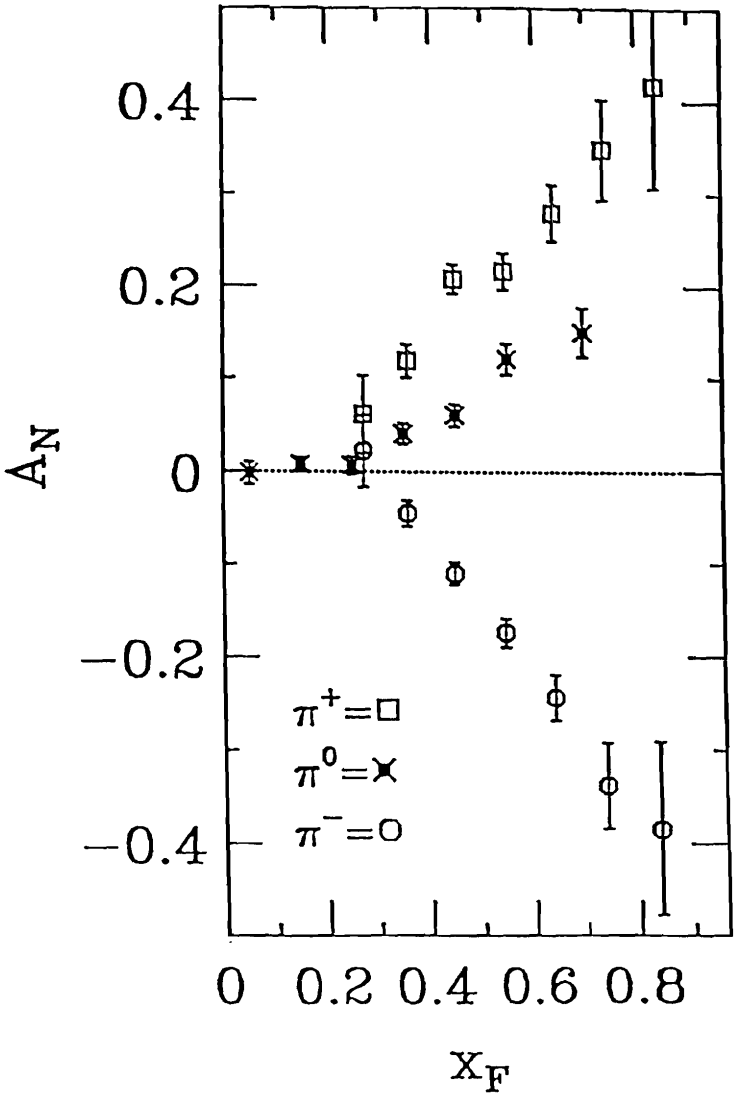
$p^{\uparrow}p \rightarrow \pi^{\pm} X$ at $x_F = 0$ to 1.0.



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

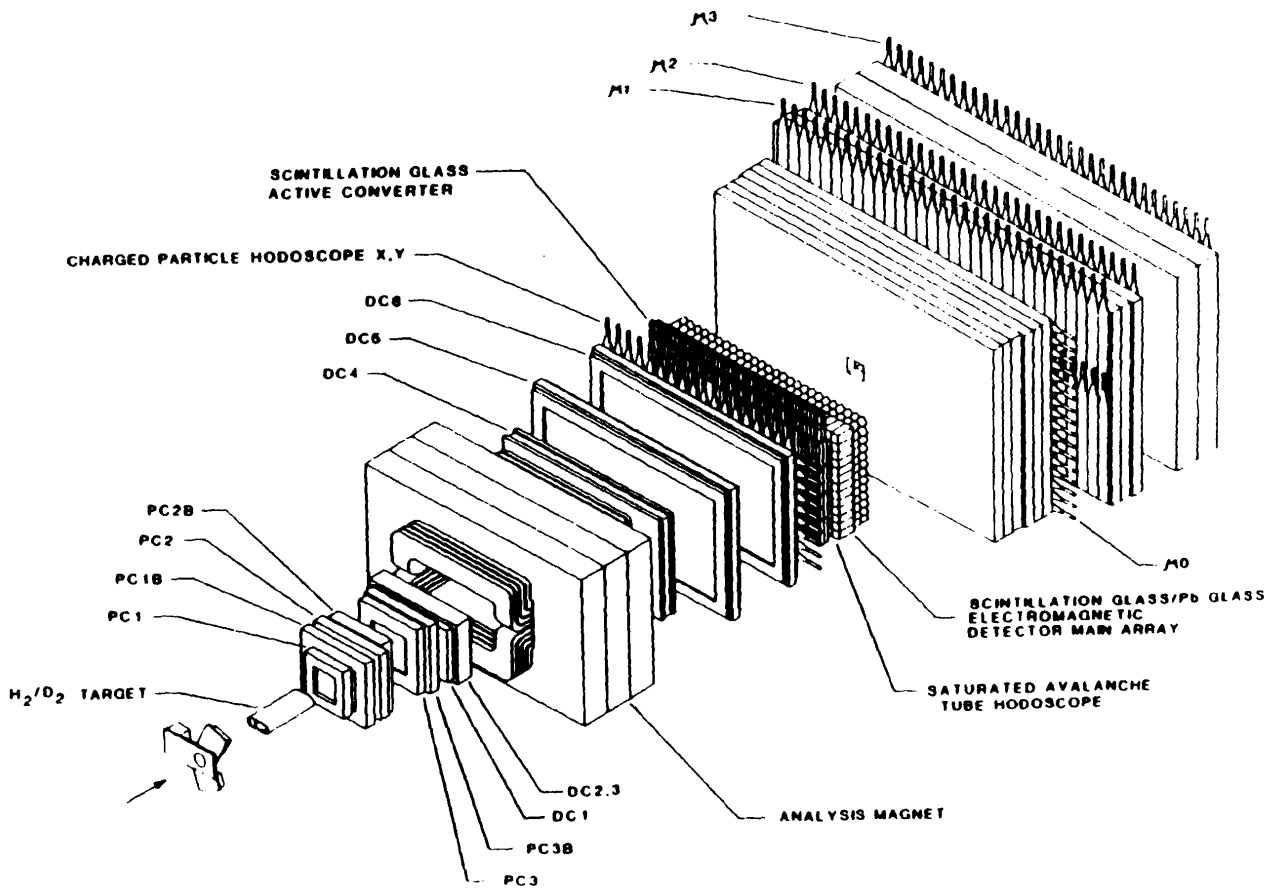


The asymmetry A_N in the reactions $P + P \rightarrow \pi^\circ + X$ and $\overline{P} + P \rightarrow \pi^\circ + X$ at 200 GeV in different regions of x_F, integrated over p_T from 0.5 to 2 GeV/c.



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

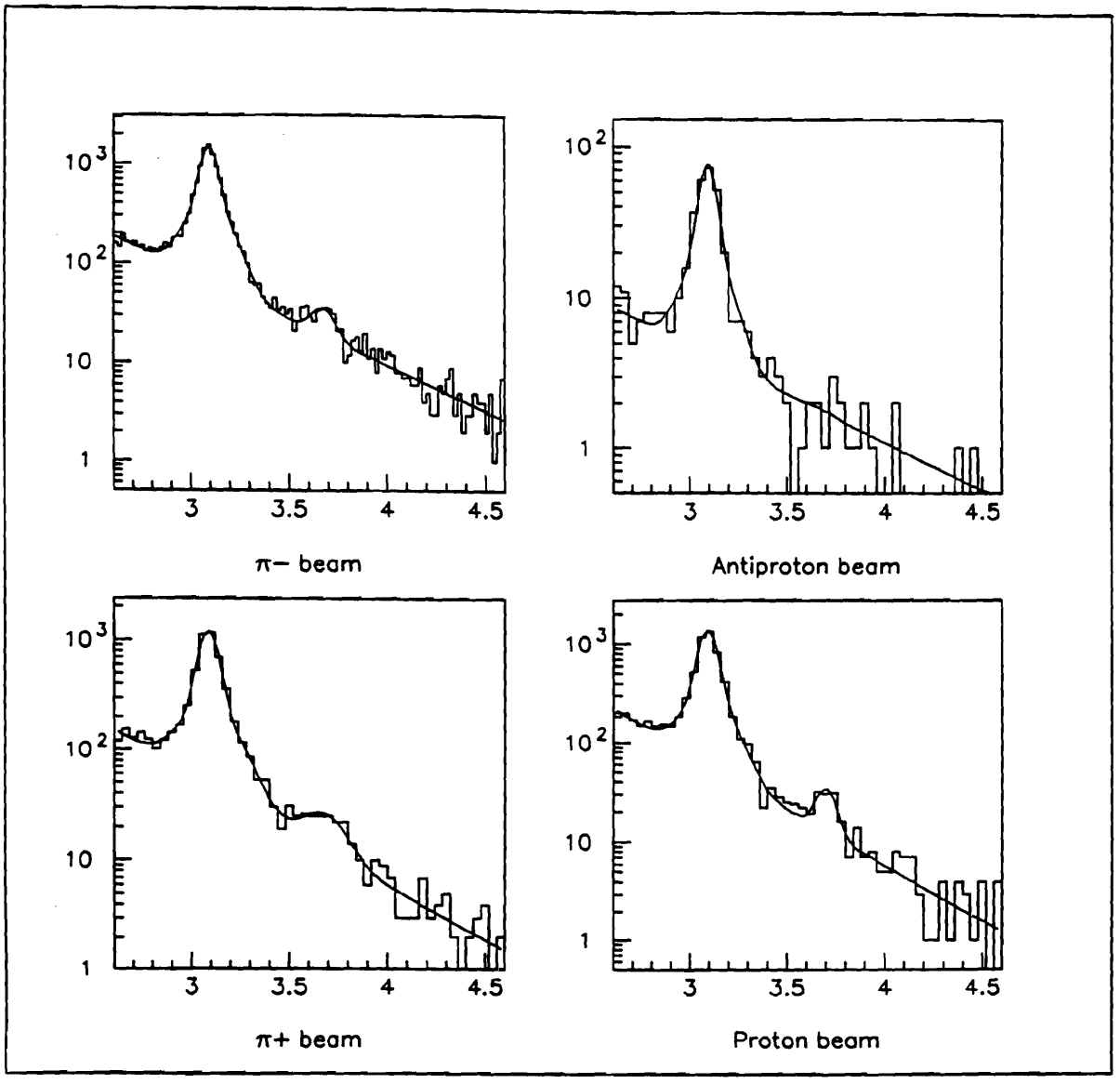
Status: *Data Analysis*

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

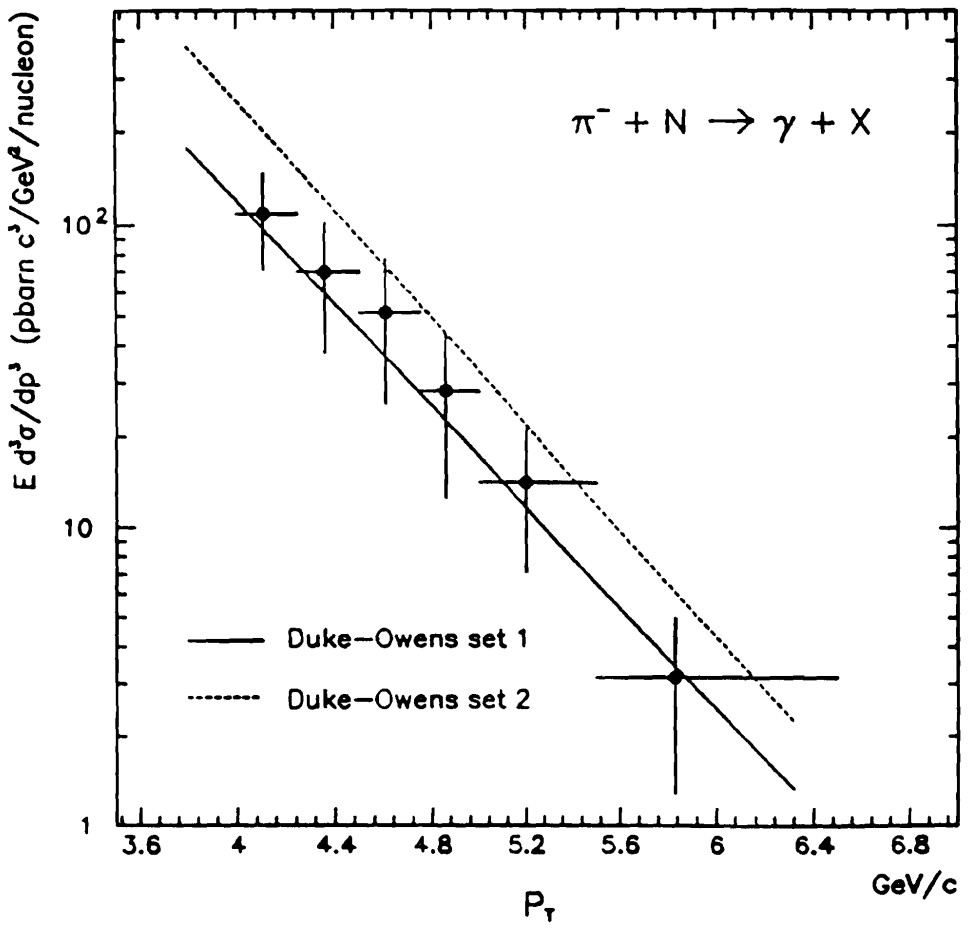
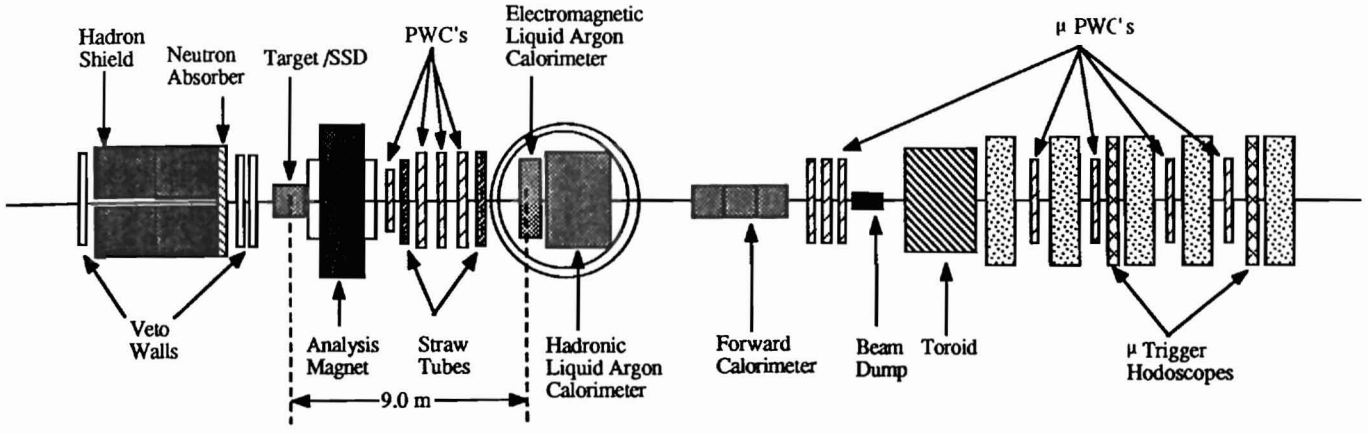
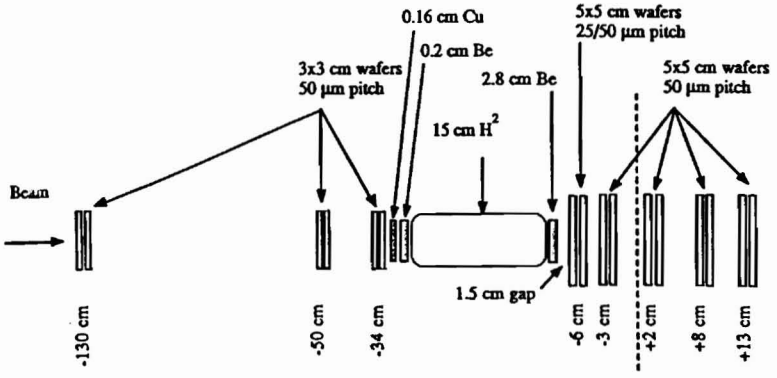


Figure 7.11 Direct photon inclusive invariant cross section for the π^-Li data as a function of p_T averaged over x_F. The errors are statistical only. The solid and dotted lines are the QCD predictions with optimized scales and the Duke and Owens sets 1 and 2 structure functions respectively.

E-706



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*

Fermilab E-706 is a second generation fixed target experiment designed and constructed to carry out a comprehensive study of events containing high transverse momentum direct photons produced in hadronic interactions. At the lowest order, the two diagrams contributing to direct photon production are the QCD Compton diagram $q + g \rightarrow q + \gamma$ and the quark-antiquark annihilation diagram $q + \bar{q} \rightarrow g + \gamma$. Next to leading order QCD calculations are now available for both inclusive direct photon cross sections and for direct photon plus jet production.

The physics goals of E-706 include measurement of the gluon structure function of the nucleon as well as the gluonic content of mesons (π^-, π^+, and perhaps charged kaons). The E-706 meson data is at a significantly higher $\sqrt{s}$ (31 GeV) than all previous experiments, which are clustered together at similar $\sqrt{s}$ (23 GeV). The study of the production of direct photon plus jet events (including $\gamma\gamma$ production) will provide sensitive tests of next to leading order QCD predictions. The direct photon data will also be employed for quark and gluon fragmentation studies.

The MWest spectrometer is a sophisticated large acceptance multi-particle spectrometer. The MWest beamline includes muon spoilers and a differential Cerenkov counter. Upstream of the target are several veto walls and hadron shielding to minimize the impact of beam related muons incident upon the spectrometer. Upstream of the target are six planes of silicon strip detectors, each of 50 μm pitch. The use of several nuclear targets (hydrogen, beryllium, and copper) will also allow an investigation of the nuclear dependence of direct photon production. Immediately downstream of the target is a pair of silicon strip detectors, which have 25 μm pitch in the central region and 50 μm pitch on the outer edges. Following that are eight additional silicon strip planes of 50 μm pitch. The large aperture conventional analysis magnet provides a transverse momentum (P_T) impulse of 450 MeV/c to charged tracks. Downstream of the analysis magnet are four proportional wire chambers, 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 straw tube chamber resolutions are 300 μm per plane and 250 μm per plane respectively. The finely segmented and focussed electromagnetic lead and liquid argon calorimeter has a radius of 1.6 m and is located 9 m downstream of the target. The full width at half maximum of the reconstructed high P_T π° mass peak is 8 MeV/c^2, and the corresponding value for the η is 20 MeV/c^2. A large steel and liquid argon hadron calorimeter is located behind the electromagnetic calorimeter. An iron and scintillator calorimeter covers the forward cone passing through a central hole in the

liquid argon calorimeters. Downstream of the forward calorimeter is a muon identification system. The spectrometer triggers upon high P_T electromagnetic showers detected in the electromagnetic liquid argon calorimeter.

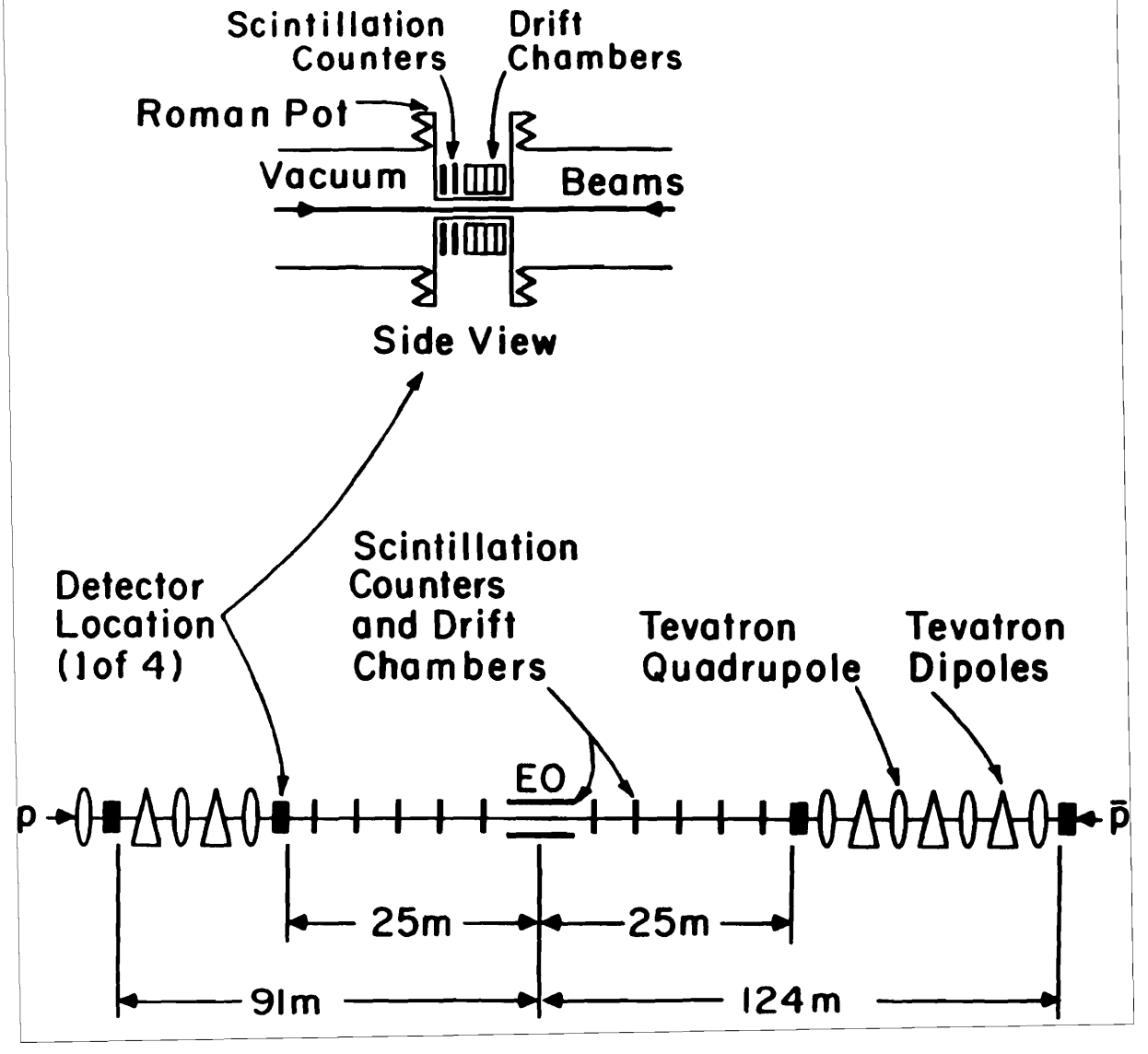
The MWest spectrometer was first exposed to beam during the 1987-1988 fixed target run. In addition to commissioning the spectrometer, approximately 5 million physics quality triggers were recorded during that run using positive and negative 500 GeV beam on copper and beryllium targets. Fifteen students have completed their Ph.D. research based upon that data sample, and two more students will finish soon. These students have investigated a wide variety of topics including spectrometer performance, neutral pion production at low transverse momentum, neutral pion and eta production at high transverse momentum, direct photon production at high transverse momentum, recoiling event 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. High P_T π^0 and direct photon production cross section results from the 1987-88 run have been submitted for publication. Papers on several other topics are in preparation.

During the 1990 fixed target run, about 30 million physics quality triggers generated by negative 530 GeV beam incident on beryllium and copper targets were recorded. This data increases our negative 530 GeV statistics by more than a factor of 15.

A 0.02 interaction length liquid hydrogen target has been designed, installed, and tested for use during the 1991 fixed target running. During 1991, we have already accumulated 18 million physics quality triggers using an 800 GeV primary proton beam incident on hydrogen, beryllium, and copper as well as 9 million physics quality triggers using a 530 GeV positive beam incident upon the same targets.

It is expected that at least fourteen more graduate students will complete their Ph.D. research using the data accumulated during the 1990-91 fixed target run. The large acceptance MWest multiparticle spectrometer has already demonstrated its versatility. The unique, large-statistics high-quality direct photon data samples acquired by E-706 will provide insight 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 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; a second method of normalization, using the known Coulomb scattering cross section, will also be attempted in future analysis.

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

$$\sigma_T = 72.8 \pm 3.1 mb;\ \rho = 0.140 \pm 0.069;\ \sigma_{single\ diffraction} = 11.7 \pm 2.3 mb;$$

the logarithmic slope of elastic scattering is constant within errors over the range $0.034 \leq |t| \leq 0.65\ (GeV/c)^2$.

Current analysis efforts are now on the data taken at $\sqrt{s}$ = 300, 546 and 1020 GeV, and on further single diffraction results at $\sqrt{s}$ = 1.8 TeV.

E-710 Theses

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

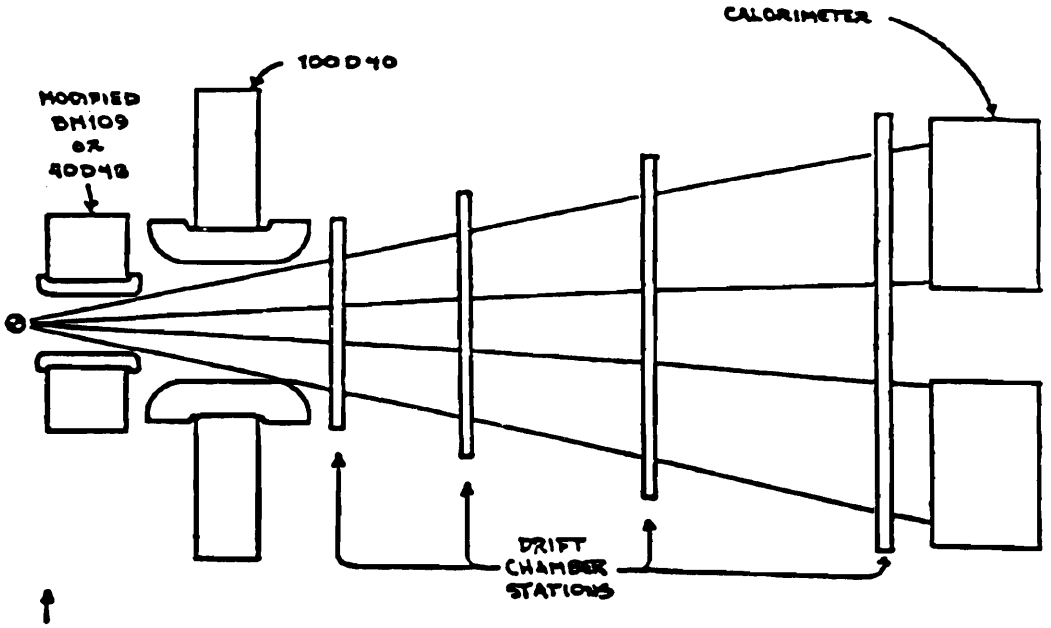
E-710 Publications

N. A. Amos et al Nucl. Instr. Meth. A252, 263 (1986); Phys. Rev. Lett. 61, 525 (1988); Phys. Rev. Lett. 63, 2784 (1989); Phys. Lett. B243, 158 (1990); Phys. Lett. B247, 127 (1990), Revista Colombiana de Fisica 23, #1, p 43 (1991), Fermilab-PUB-91/267.

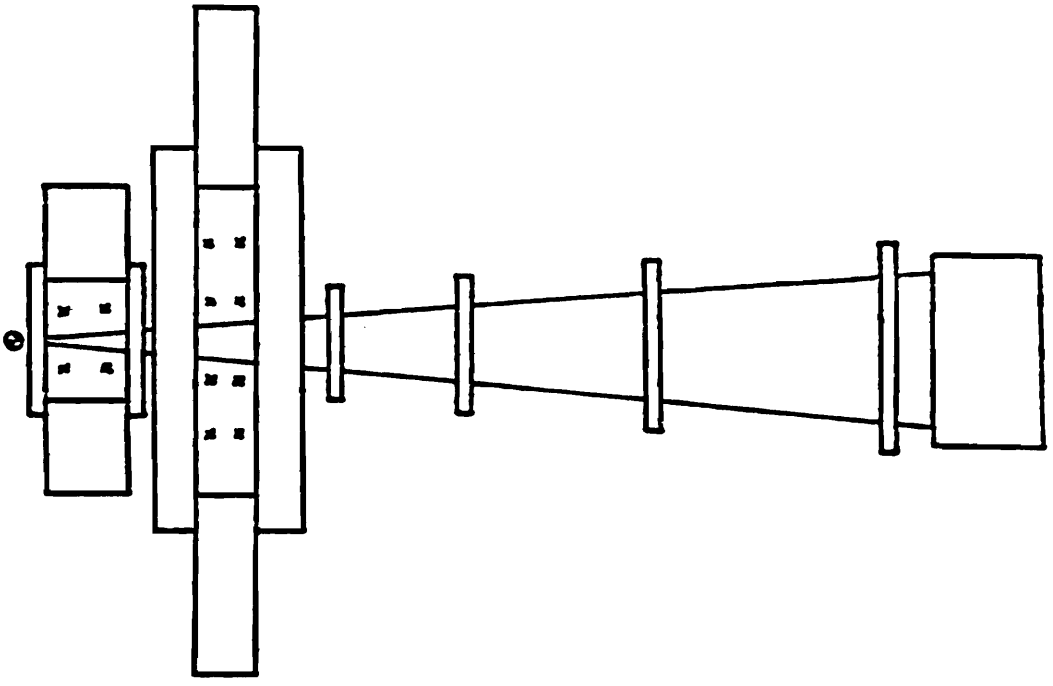
E-710 Major Conference Reports

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.

E-711



DETECTOR ELEVATION (NON-BEND VIEW)



DETECTOR PLAN VIEW (BEND VIEW)

E-711 (Levinthal) A Study of the Angular and Energy Dependence of Constituent Scattering Through Measurements of the Reaction $p + N \rightarrow h_1 + h_2 + X$

ANL, Fermilab, Florida State, Michigan

Status: *Data Analysis*

The experiment used a primary proton beam and nuclear targets to measure the reaction $p + N \rightarrow h_1 + h_2 + X$ where h_1 and h_2 are both high transverse momentum hadrons - roughly back-to-back in the pN center of mass system. By determining the angular distribution and mass dependence of the cross-section of the di-hadron system, the experiment has extracted the angular and energy dependence of the underlying hard constituent scattering. The experiment triggered on events containing two high transverse momentum hadrons using a hadron calorimeter and used a magnetic spectrometer to measure the charge and obtain the momenta of the two hadrons with good resolution.

E-711 completed its data taking in February of 1988. Since that time, three doctoral theses have been written and accepted:

1) The Atomic Weight Dependence and Mass Cross Sections of Massive Pair Production in Proton-Nucleus Collisions at 800 GeV/c by Kathy Turner Streets (Florida State University)

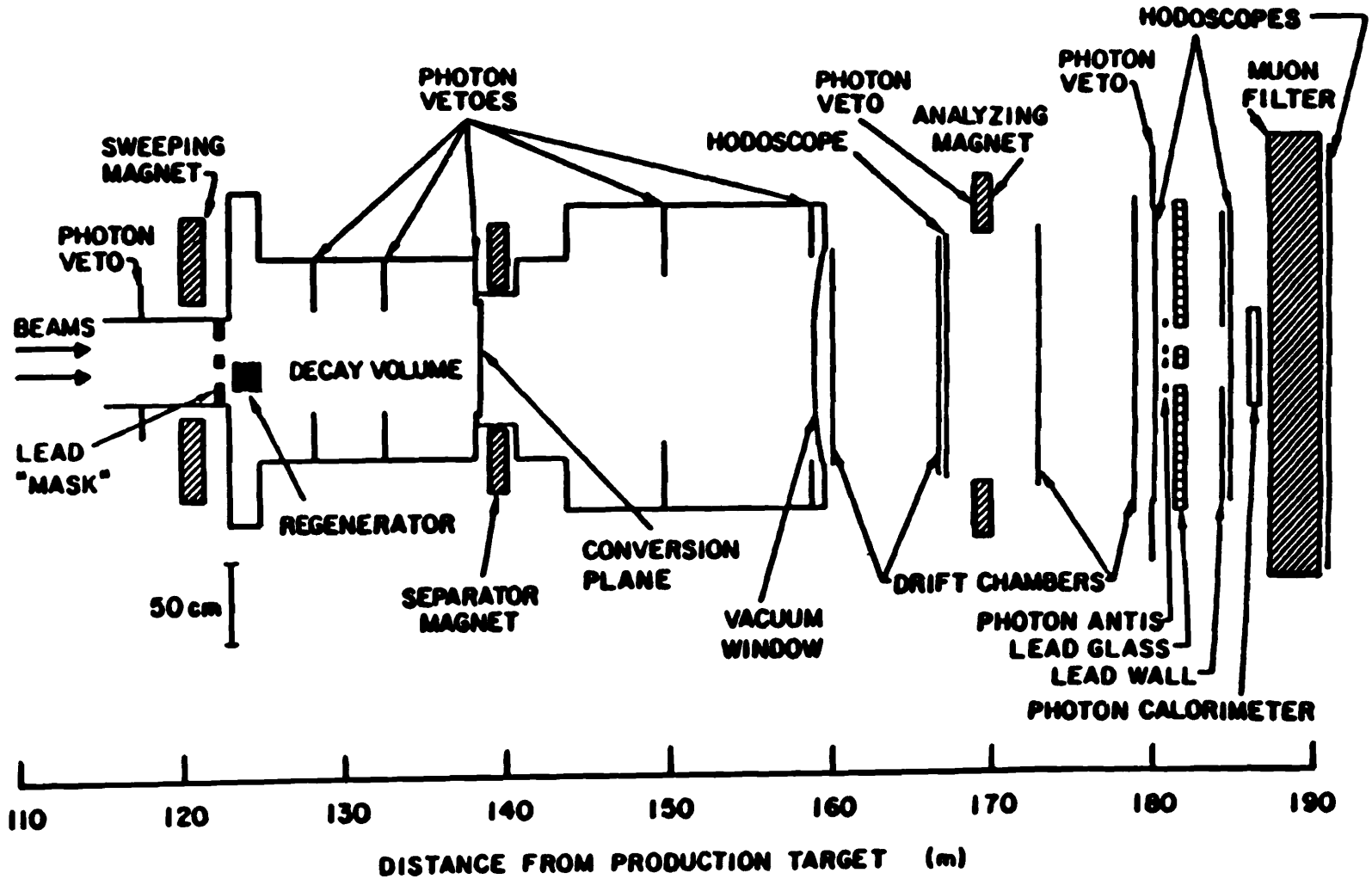
2) An Experimental Determination of the Average Fraction of Jet Momentum Carried by the Leading Hadrons Produced at Large Transverse Momenta by G. Boca (Florida State University)

3) Mass and Angular Distributions of Charged Dihadron Production by Mary Anne Cummings (University of Michigan)

E-711 Publications

Streets et al., Atomic-Weight Dependence of the Production of Hadron Pairs by 800 GeV/c Hadrons on Nuclear Targets, Phys. Rev. Lett. 66, 864 (1991).

Boca et al., Average Fraction of Jet Momentum carried by High P_t Leading Hadrons, Zeitschrift Fur Physik, C49, 543 (1991).


HODOSCOPES
PHOTON VETO
MUON FILTER
PHOTON VETOES
PHOTON VETO
ANALYZING MAGNET
HODOSCOPE
SWEEPING MAGNET
PHOTON VETO
BEAMS
DECAY VOLUME
LEAD "MASK"
REGENERATOR
CONVERSION PLANE
50 cm
SEPARATOR MAGNET
VACUUM WINDOW
DRIFT CHAMBERS
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^o-$\bar{K}$ 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 $K^o \leftrightarrow \bar{K}$. 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, $K_L \rightarrow 3\pi^o$ 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 $K_L \rightarrow 2\pi^o$ events, 370K $K_L \rightarrow \pi^+\pi^-$ events, and 1M each of $K_S \rightarrow 2\pi^o$ and $K_S \rightarrow \pi^+\pi^-$. Several results have been published based on a 20% subset of the data. The value of $Re(\varepsilon'/\varepsilon)$ 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.

E-731 Publications and Theses

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 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).

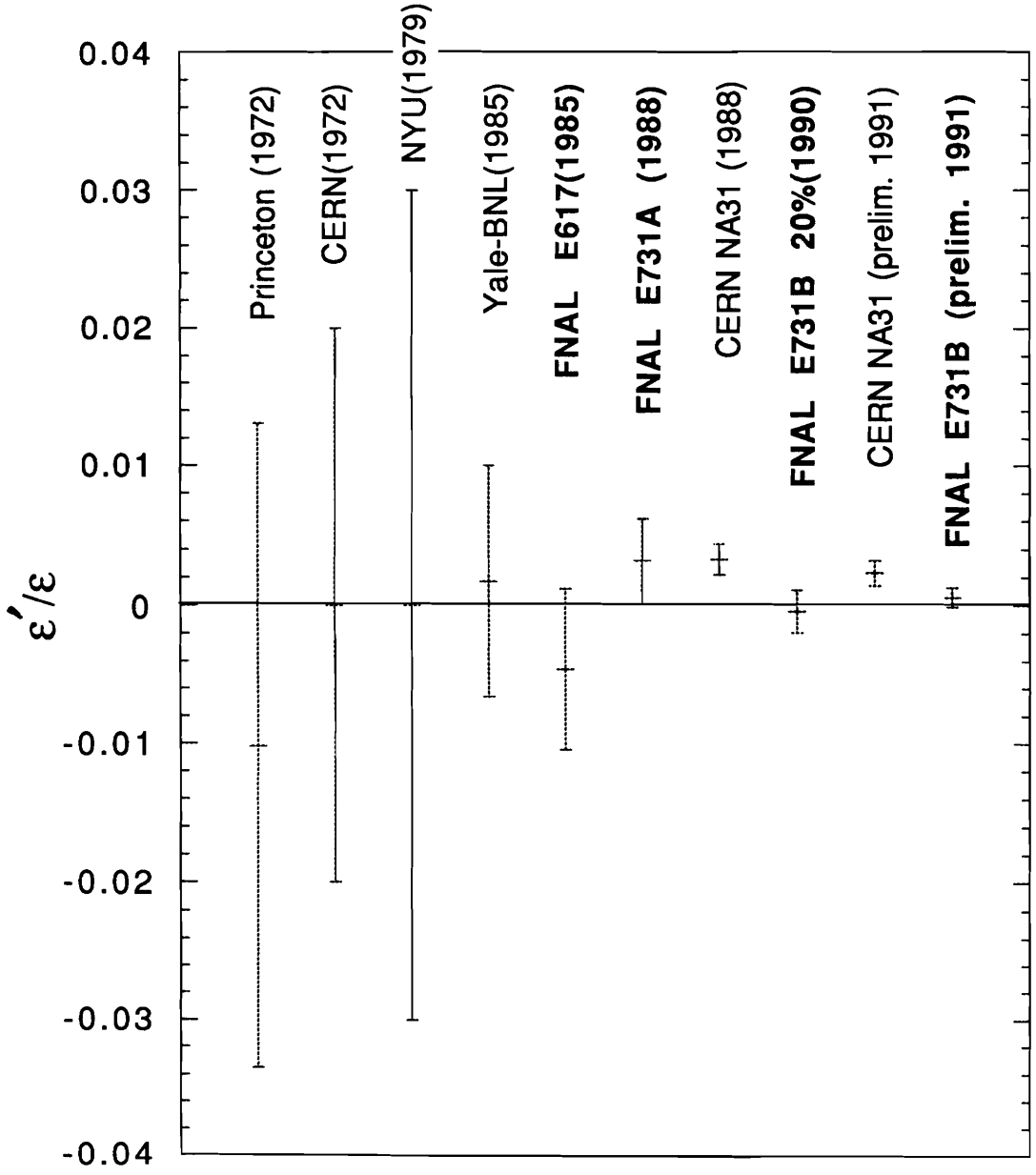
Test of CPT Symmetry Through a Determination of the Difference in the Phases of η_{00} and η_{+-} in $K \rightarrow 2\pi$ Decays, M. Karlsson et al., Phys. Rev. Lett. 64, 2974 (1990).

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

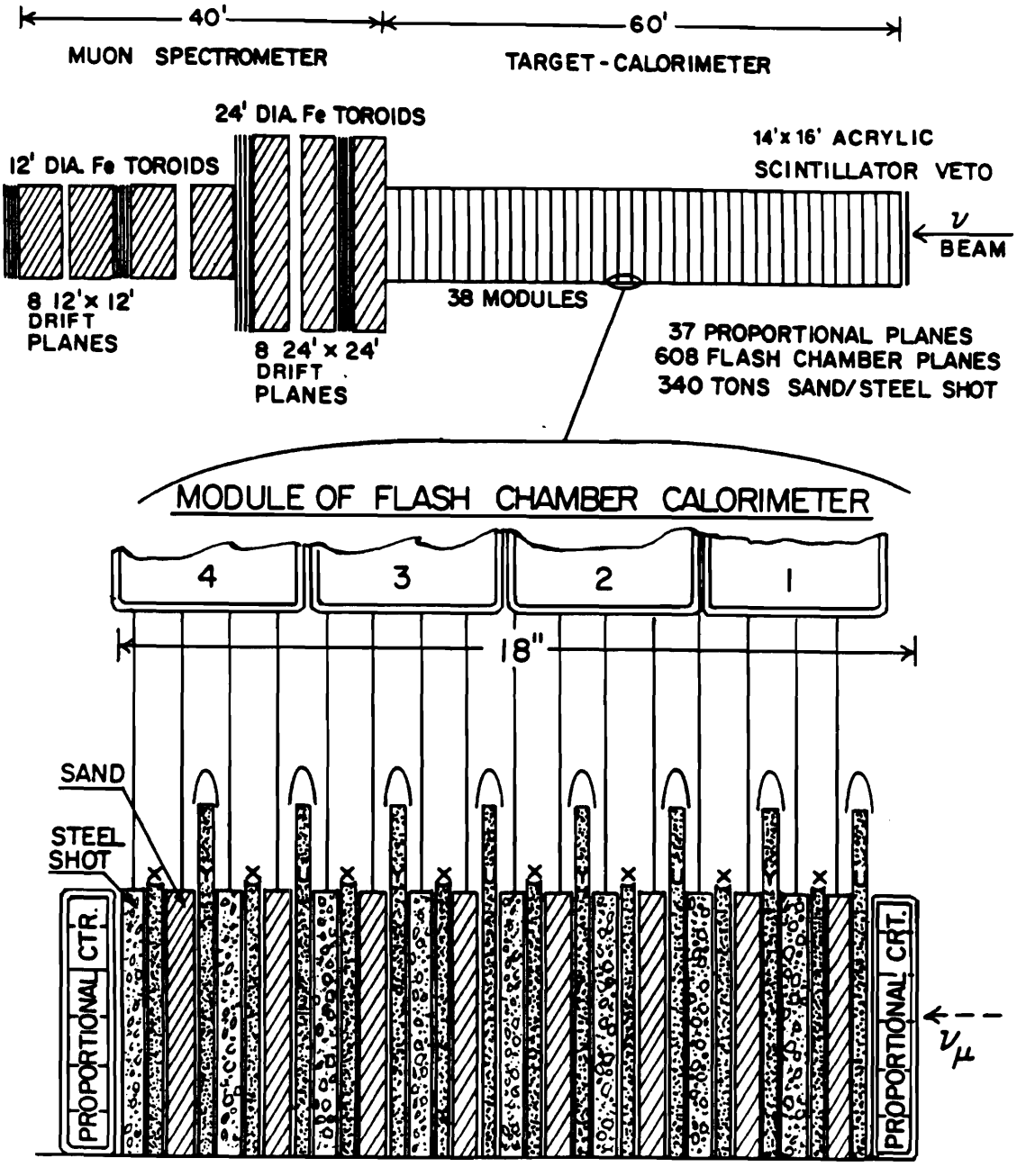
Determination of $Re(\varepsilon'/\varepsilon)$ by the Simultaneous Detection of the Four $K_{L,S} \rightarrow \pi\pi$ Decay Modes, Thesis, J. Ritchie Patterson.

CPT Symmetry of Neutral Kaons: An Experimental Test, Thesis, Magnus Karlsson.

Search for the Decay $K_L \rightarrow \pi^0 \gamma\gamma$, Thesis, Vaia Papadimitriou.


0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
ε′/ε
Princeton (1972)
CERN(1972)
NYU(1979)
Yale-BNL(1985)
FNAL E617(1985)
FNAL E731A (1988)
CERN NA31 (1988)
FNAL E731B 20%(1990)
CERN NA31 (prelim. 1991)
FNAL E731B (prelim. 1991)

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
38 MODULES
8 24' x 24'
DRIFT
PLANES
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 CRT.
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 $\mathrm{MeV/c^2}$. 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.

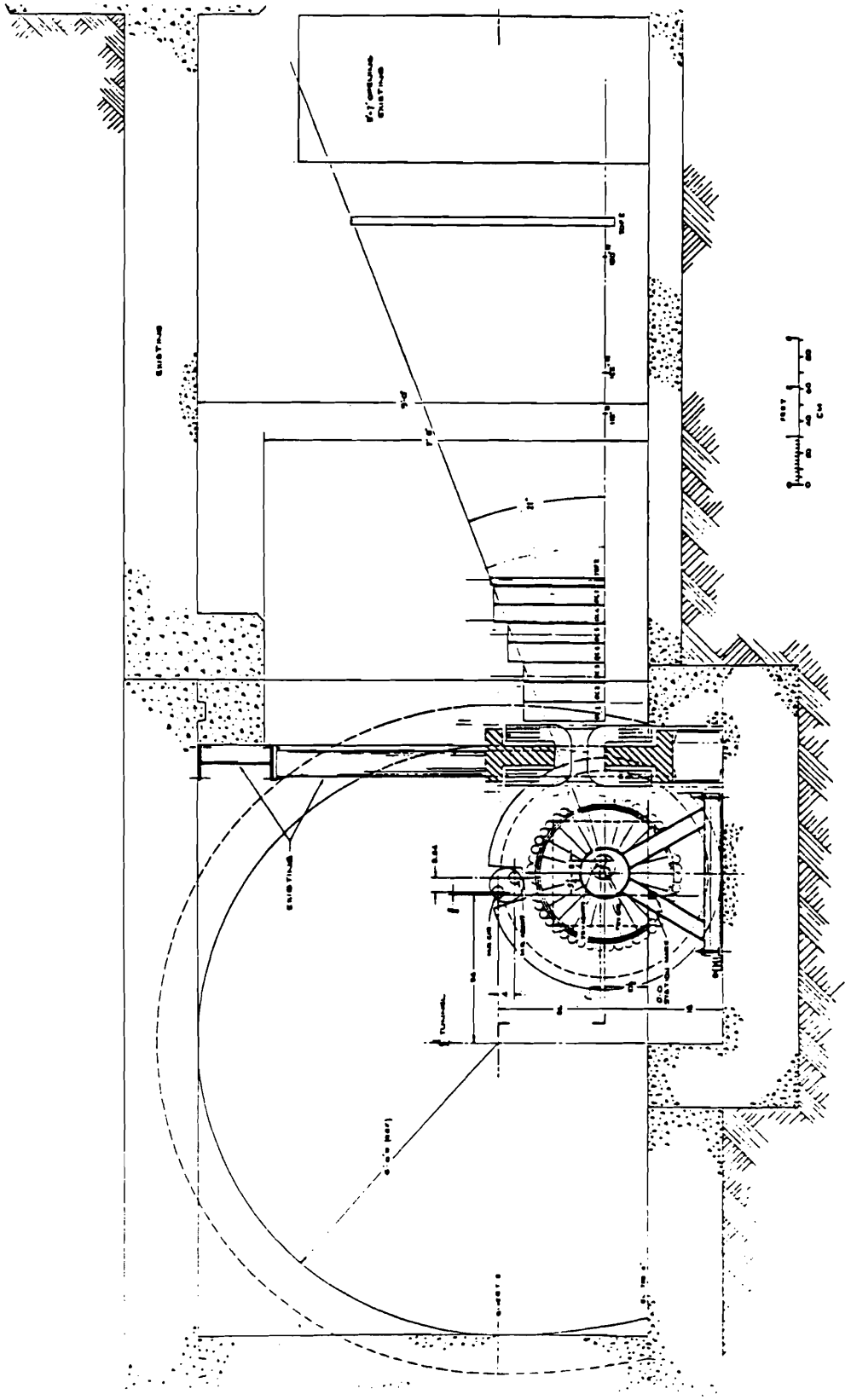
Once this is accomplished we can, in a model-independent fashion, set a limit on any physics reaction (heavy leptons, WIMPs, SUSY, ??) by pattern-recognizing the characteristics of the event and setting a CL based on seeing no events (?) within a window.

E-733 Published paper

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

E-733 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 intermittancy 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 Phd's 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.

E-735 Refereed Papers

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

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., "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).

E-735 Theses

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 7-11, 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", Aug. 28-30, 1989.

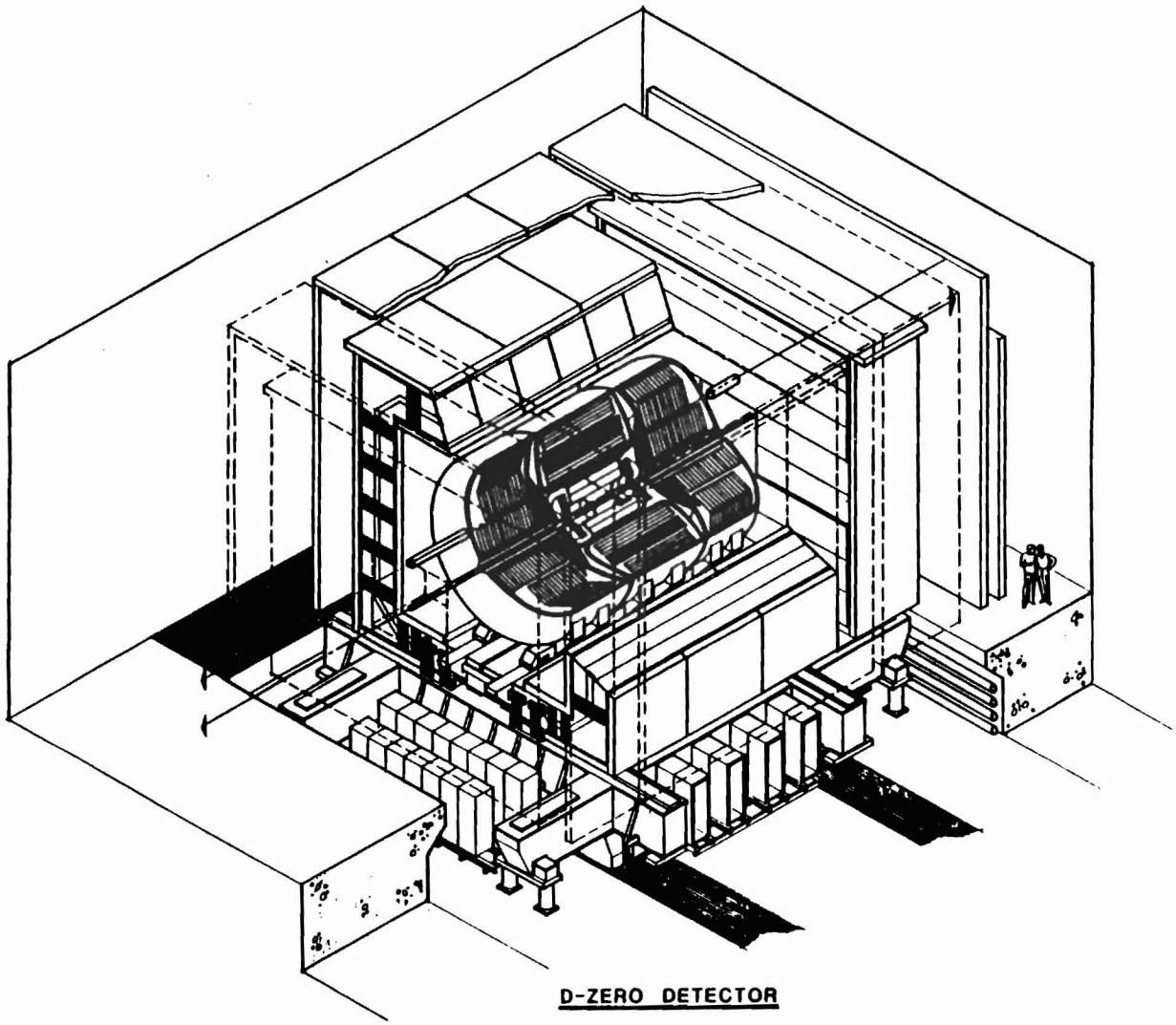
L. Gutay, "Deconfinement Signature, Mass Dependence of Transverse Flow and Time Evolution in Antiproton-Proton Collisions at $\sqrt{s}$ =1.8 TeV." Talk presented at the "6th Nordic Meeting on Nuclear Physics," Korpervik, Norway, Aug.10-15, 1989. Published Physica Scripta Vol. T32, 122-125, 1990.

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 26 - March 4, 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 6-12 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, Sept. 25-30, 1988, Nuc. Phys. Vol. A498,181-192 (1989).

E-740/823



D-ZERO DETECTOR

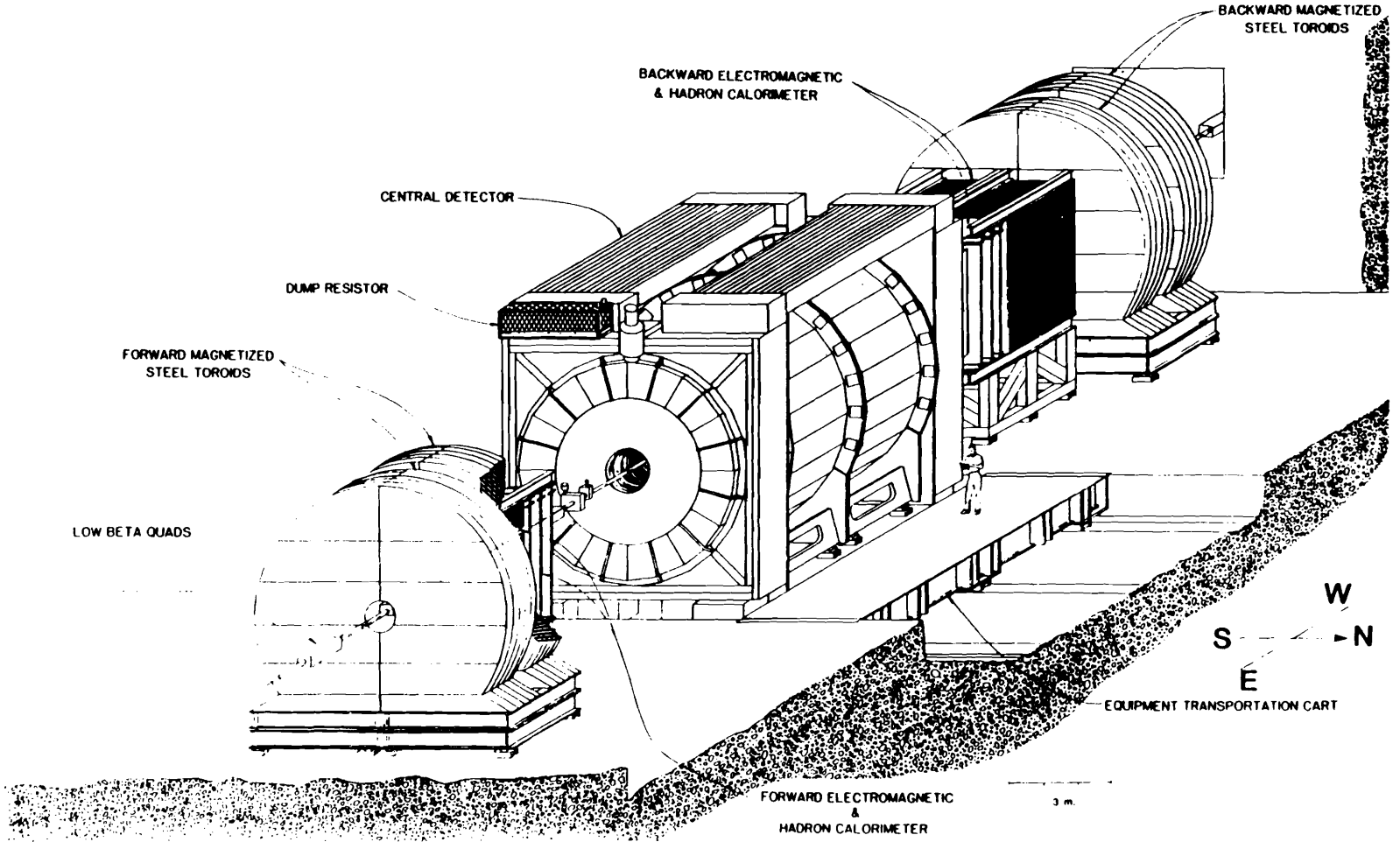
E-740 / 823 (Grannis) Study of Events in $\bar{p}p$ Collisions at 2 TeV in the D0 Detector

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

Status: *No Data Yet*

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.


BACKWARD MAGNETIZED
STEEL TOROIDS
BACKWARD ELECTROMAGNETIC
& HADRON CALORIMETER
CENTRAL DETECTOR
DUMP RESISTOR
FORWARD MAGNETIZED
STEEL TOROIDS
LOW BETA QUADS
W
S
N
E
EQUIPMENT TRANSPORTATION CART
FORWARD ELECTROMAGNETIC
&
HADRON CALORIMETER
3 m.

E-741 (Shochet / Tollestrup) Collider Detector at Fermilab

ANL, Brandeis, Chicago, Fermilab, Harvard, Illinois, INFN/Frascati (Italy), INFN/Pisa (Italy), Johns Hopkins, KEK (Japan), LBL, Michigan, Pennsylvania, Purdue, Rochester, Rockefeller, Rutgers, Texas A&M, Tsukuba (Japan), Tufts, Wisconsin

Status: *Data Analysis*

The Collider Detector at Fermilab (CDF) is a general purpose detector system designed to explore the physics of 2 TeV proton-antiproton collisions made possible by the Tevatron I Project. It consists of a central magnetic detector that covers the angular range 10° to 170° with respect to the incident proton direction and two forward/backward detectors that cover the ranges 2° to 10° and 170° to 178°, respectively. The basic goals of the detector include: 1) the measurement of electromagnetic and hadronic energy flow in fine bins of rapidity and azimuthal angle over the entire angular range of CDF with uniform granularity using systems of shower counters and hadron calorimeters, 2) measurements of the directions of charged particles to angles as close to the incident beam directions as technically possible, 3) momentum analysis of charged particles over the angular range 15° to 165°, and 4) identification and momentum analysis of muons over the angular ranges 3° to 16°, 56° to 124°, and 164° to 177°.

The major detector components are:

1. Central detector solenoid magnet with superconducting coil.

2. Charged particle tracking system organized into a central tracking chamber for momentum analysis, and a vertex time projection chamber to find event topologies.

3. Electromagnetic shower counters covering the full angular acceptance of CDF for identifying photons and electrons. There are three subsystems of shower counters, Central, End Plug, and Forward.

4. Hadron calorimeters backing up the shower counters. In addition to the three regions covered by the shower counters, the end wall of the solenoid magnet is instrumented with hadron calorimeters.

5. Muon detectors. The central muon system is behind the central hadron calorimeters; the forward system includes magnetized iron toroids for momentum measurements.

6. Front-end, trigger, and data acquisition electronics systems and online computers for selecting events, recording data, and monitoring all of the detector systems.

7. Beamline equipment including luminosity monitors.

In the 1987 commissioning run, $33nb^{-1}$ of integrated luminosity were accumulated. The first major physics run was June 1988 to May 1989, and a total of 4.7 pb^{-1} was accumulated on tape. The full CDF detector was in place for this entire run, including the full Level 3 trigger system of ACP processors. The detector and data acquisition system coped well with the delivered peak luminosities of $2x10^{30}cm^{-2}sec^{-1}$ -- a rate which was twice the design luminosity of the Tevatron Collider. About 5500 9-track tapes were written. Initial processing took place on two systems of 65 ACP nodes each; the final processing of all the data was done on the two ACP systems augmented by a third system of microVAX nodes.

1990 has seen continued activity in analysis of the 1988-89 data. A total of 18 papers on CDF results have been published in Physical Review Letters, and seven more have been submitted for publication. At conferences around the world, 48 talks have been presented, and 10 talks will be given at the 1991 Washington APS meeting. There are 71 graduate students currently working on CDF, and a total of 30 have submitted theses for their degrees on CDF data.

The following physics topics are in various stages of completion from the 1988-89 data:

1. From samples of $Z^0 \rightarrow \mu^+\mu^-$ and $Z^0 \rightarrow e^+e^-$ the mass of the Z^0 has been measured to be $M(Z^0) = 90.9 \pm 0.3(\text{stat.+syst.}) \pm 0.2(\text{scale})$ GeV/c^2.

2. From samples of $W^\pm \rightarrow \mu^\pm\nu$ and $W^\pm \rightarrow e^\pm\nu$ the mass of the W has been measured to be $M(W) = 79.91 \pm 0.39$ GeV/c^2. The value of $\sin^2\theta_w$ is thus determined to be 0.232 ± 0.008.

3. A search for the top quark through the decay channel: $t\bar{t} \rightarrow e$ + jets. The existence of a standard-model top quark is excluded in the mass range 40 to 77 GeV/c^2 at the 95% confidence level.

4. A search for the top quark or fourth-generation b quark (b') through the decay channel: $t\bar{t} \rightarrow e\mu$. The existence of a standard-model top quark or b' in the mass range 28 to 72 GeV/c^2 is excluded at the 95% confidence level.

5. Further analysis of other di-lepton signatures has been done, e.g. $t\bar{t} \rightarrow e^+e^-$, $\rightarrow \mu^+\mu^-$, and $\rightarrow e$ + softμ. A preliminary combined result of all di-lepton modes places a lower limit of 89 GeV/c^2 on the top mass.

6. We have measured $R = [\sigma \bullet B(W \rightarrow e\nu)]/[\sigma \bullet B(Z \rightarrow ee)]$, the cross-section-branching-fraction ratio, to be $R = 10.2 \pm 0.8(\text{stat.}) \pm 0.4(\text{syst.})$. Combining this with other measurements, we find the width of the W to be $\Gamma(W) = 2.19 \pm 0.20$ GeV.

7. From a measurement of the forward-backward asymmetry in the decay $Z^0 \rightarrow e^+e^-$, we have determined $\sin^2\theta_w = 0.228 \pm 0.015 \pm .002(\text{syst.})$. (Preliminary result.)

8. We have put 95% confidence lower limits on the masses of a heavy W or a heavy Z at 480 GeV/c^2 and 380 GeV/c^2, respectively. (Preliminary result.)

9. We have measured $\sigma \cdot B$ for $W \rightarrow e\nu = 2.19 \pm 0.04(stat.) \pm 0.21(syst.)$ nb and $\sigma \cdot B$ for $Z \rightarrow e^+e^- = 0.209 \pm 0.013(stat.) \pm 0.017(syst.)$ nb.

10. We have measured the $\bar{p}p \rightarrow e^+e^-$ spectrum (Drell Yan) and set limits on quark compositeness at the 2 TeV level.

11. We have studied lepton universality by comparing the $\sigma \cdot B$ for $W \rightarrow e\nu$ with $W \rightarrow \tau\nu$.

12. We have searched for a light Higgs Boson in the process $Z^0 \rightarrow Z^0 + H^0$ with the H^0 decaying to two light charged particles (e^+e^-,$\mu^+\mu^-$,$\pi^+\pi^-$). At the 95% confidence level the existence of such a particle with standard model couplings is excluded in most of the mass range below 1 GeV/c^2.

13. We have measured the transverse momentum distributions of the electro-weak gauge bosons.

14. We have measured the transverse energy distribution (E_T) of jets out to a E_T of 400 GeV and a limit on quark compositeness $\Lambda^* \geq 950$ GeV.

15. We studied 2-jet invariant mass distributions to search/set limits on axigluons and strong dynamical symmetry breaking models such as technicolor.

16. We examined 3-jet distributions for differences due to initial states. This allows fits to the fractions of events resulting from $q\bar{q}$, qg, and gg initial states.

17. We performed detailed comparisons of jet shapes and cross sections with new theoretical QCD predictions performed at next-to-leading order.

18. We examined the global properties of the highest transverse energy events seen at the Tevatron Collider.

19. We measured the direct photon cross section and angular distribution, and compared it to new, more precise theoretical calculations. Measurements of η and ρ production are in progress.

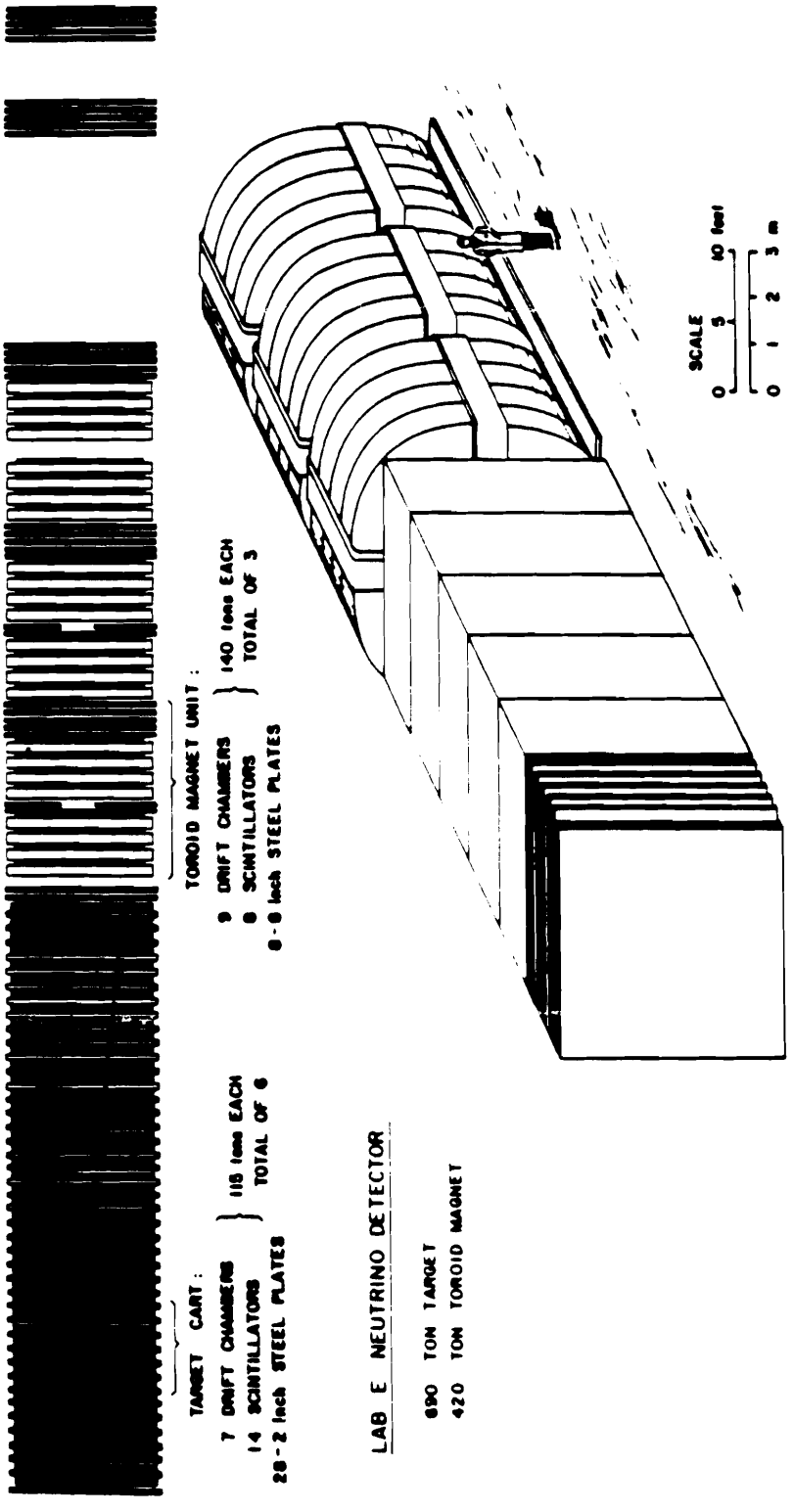
20. The inclusive p_T spectrum of B decays has been measured. Observation of $D^o \rightarrow K\pi$ from $B \rightarrow e\nu D$ confirms that at high p_T the inclusive electron p_T spectrum (with W's removed) is well described as dominantly due to B decay.

21. We have observed exclusive B decays $B^{\pm} \rightarrow J/\psi + K^{\pm}$ and $B^o \rightarrow J/\psi + K^{o*}$.

22. The branching ratio for $B_d^o \rightarrow \mu^+\mu^-$ is measured to be $<3.2 \times 10^{-6}$ (at 90% C.L.).

23. The missing E_T search for SUSY (supersymmetry) particles has been extended, and no evidence for their existence is found at masses up to 150 GeV.

E-744/770


TARGET CART :
7 DRIFT CHAMBERS
14 SCINTILLATORS
28 - 2 inch STEEL PLATES
} 115 tons EACH TOTAL OF 6
TOROID MAGNET UNIT :
9 DRIFT CHAMBERS
8 SCINTILLATORS
8 - 6 inch STEEL PLATES
} 140 tons EACH TOTAL OF 3
SCALE
0 5 10 feet
0 1 2 3 m
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 650 ton iron target instrumented as a calorimeter with high density tracking, and a toroid system for momentum measurement of the muon.

In the first Quadrupole Triplet neutrino run (E-744) 1.7 million charged current events were accumulated during 1985, and in the second run (E-770), finished in February, 1988, about 1.9 million charged current events were accumulated. Recent results include:

1. Gross-Llewellyn Smith Sum Rule: 2.50 ± .018 (stat.) ± .075 (syst). (Measurement of the number of valence quarks).

2. $\sigma_{\bar{\nu}}/\sigma_{\nu}$: .511 ±.002 (stat.) ±.005 (syst) up to E_{ν} = 600 GeV.

3. Measurements of Structure Functions: The data show for the first time a Q^2 evolution of xF_3 consistent with that expected from QCD. The value of Λ_{MS} from the non-singlet evolution with $Q^2 > 15$ GeV^2 is 215 ± 28 ± 41 MeV. Comparisons of F_2 and xF_3 with other measurements show good agreement with the SLAC eD and BCDMS μD data but differ from the CDHSW νFe and EMC μFe data. These comparisons also produce a precise test of the mean-square charge prediction by the Quark Parton Model.

4. Strange quark content of the nucleon: $\eta_s = 0.057^{+0.012}_{-0.008}$ and the Kobayashi-Maskawa (KM) matrix element $|V_{cd}| = 0.220^{+0.015}_{-0.018}$ from opposite sign dimuons. The data are consistent with the slow rescaling hypothesis of charm production in ν-N scattering and yield a value of the charm quark mass parameter $m_c = 1.31^{+0.64}_{-0.48}$ GeV/c^2.

5. 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.

6. The prompt rate of same sign dimuon production with respect to single muon production: (1.0 ± 0.7) x 10^{-4} from a sample of 101 neutrino and 15 antineutrino same sign dimuons in the energy range 30-600 GeV.

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

8. A limit on wrong-sign neutrino-induced single muon production of 1.6 x 10^{-4} at 90% CL per charged current event.

9. Hadron Shower Punchthrough and Muon Production by Hadrons of 40, 70 and 100 GeV.

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

11. 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.

E-744 & E-770 Publications in Refereed Journals

Hadron Shower Punchthrough for Incident Hadrons of Momentum 15, 25, 50, 100, 200, 300 GeV/c, F.S. Merritt et al., Nucl. Inst. Meth. A245, 27 (1986).

A Search for Neutral Heavy Leptons in ν_μ- N Interactions, S.R. Mishra et al., Phys. Rev. Lett. 59,1397 (1987).

Neutrino Production of Same Sign Dimuons, B.A. Schumm et al., Phys. Rev. Lett. 60, 1618 (1988).

Inverse Muon Decay and Neutrino Dimuon Production at the Tevatron, S.R. Mishra et al., Phys. Rev. Lett. 63,132 (1989).

A Study of Wrong Sign Single Muon Production in ν_μ-N Interactions, S.R. Mishra et al., Z. Phys. C44, 187 (1989).

Neutrino Production of Opposite Sign Dimuons at Tevatron Energies, C. Foudas et al., Phys. Rev. Lett. 64, 1207 (1990).

Hadron Shower Penetration and Muon Production by Hadrons at 40, 70 and 100 GeV, P.H. Sandler et al., Phys. Rev. D42, 759 (1990).

Calibration of the CCFR Target Calorimeter, W.K. Sakumoto et al., Nucl. Inst. and Meth. A294, 179 (1990).

Inverse Muon Decay, $\nu_\mu + e \rightarrow \mu^- + \nu_e$ at the Fermilab Tevatron, S. R. Mishra et al., Phys. Lett. B252, 170 (1990).

A Study of the Space-Time Structure of the Weak Current in ν-N Interactions, S. R. Mishra et al., Submitted for Publication in Phys. Lett. B., 1991.

Measuring Muon Momenta with the CCFR Neutrino Detector, B. J. King et al., Nucl. Inst. Meth. A302, 254 (1991).

Neutrino Tridents and W-Z Interference, S. R. Mishra et al., Phys. Rev. Lett. 66, 3117 (1991).

A Study of the Space-Time Structure of the Weak Current in ν-N Interactions, S. R. Mishra et al., Submitted for publication in Phys. Lett. B., 1991.

A Measurement of TeV Muon Energy Loss in Iron, W. K. Sakumoto et al., Submitted for publication in Phys. Rev. D., 1991.

A Measurement of the Gross-Llewellyn-Smith Sum Rule from the CCFR xF_3 Structure Function, W. C. Leung et al., Submitted for publication in Phys. Rev. Lett., 1992.

Measurements of Nucleon Structure Functions $F_2(x, Q^2)$ and $xF_3(x, Q^2)$, from ν-Fe Scattering at the Fermilab Tevatron and the Mean-Square Charge Test, S. R. Mishra et al., Submitted for publication in Phys. Rev. Lett., 1992.

A Measurement of Λ_{MS} from ν_μ-Fe Structure Functions at the Fermilab Tevatron, P. Z. Quintas et al., Submitted for publication in Phys. Rev. Lett., 1992.

E-744 & E-770 Publications in Conference Proceedings

Flash ADC Readout of Hadron Showers in Drift Chambers, K.T. Bachmann et al. in Proceedings of the Gas Calorimetry Workshop, Fermilab (1985).

Production of the Same Sign Dimuons by 0-800 GeV Neutrinos and Antineutrinos, M. Oreglia et al., in Proceedings, 1987 DPF Meeting, Salt Lake City, UT (1987).

Measurement of Same Sign Dimuon Production in High Energy Neutrino Interactions, K.W. Merritt et al., in Proceedings, Lake Louise Winter Institute: Electroweak Interactions, Lake Louise, Canada (1987).

Neutrino Production of Like Sign Dimuons, H. Schellman et al., in Proceedings, Les Rencontres de Physique de la Vallee d'Aoste: Results and Perspectives in Particle Physics, Italy (1987).

Neutrino Production of Same Sign Dimuons at the Tevatron, H.S. Budd et al., in Proceedings of the 22nd Rencontres de Moriond: Hadrons, Quarks, and Gluons, Les Arcs, France (1987).

Measurement of Same Sign Dimuon Production in High-Energy Neutrino Interactions, M. J. Lamm et al., Proceedings of the 18th Int. Symp. on Multiparticle Dynamics, Tashkent, USSR, (1987).

Neutrino Production of Same Sign Dimuons, W.H. Smith et al., in Proceedings of the 1987 SLAC Summer Institute on Particle Physics, Stanford, CA (1988).

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A Search for Neutral Heavy Leptons in ν_μ- N Interactions, P. de Barbaro et al., presented at 25th Rencontres de Moriond, January, 1990.

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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Electroweak Results from the CCFR Experiment, W. H. Smith et al., in Proceedings of the 1991 DPF Annual Meeting, August, 1991, Vancouver, Canada, WISC-EX-318.

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E-744 & E-770 Theses

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.

W. Lefmann, Columbia U., Rare Phenomena, exp. 1992.

P. Sandler, U. Wisconsin, Hadron Punchthrough, Dimuons, 1992.

S. Rabinowitz, Columbia U., Opposite Sign Dimuons, exp. 1992.

W. Seligman, Columbia U., Structure Functions, exp. 1992.

B. King, Columbia U., Measurement of $Sin^2\theta_w$, exp. 1992.

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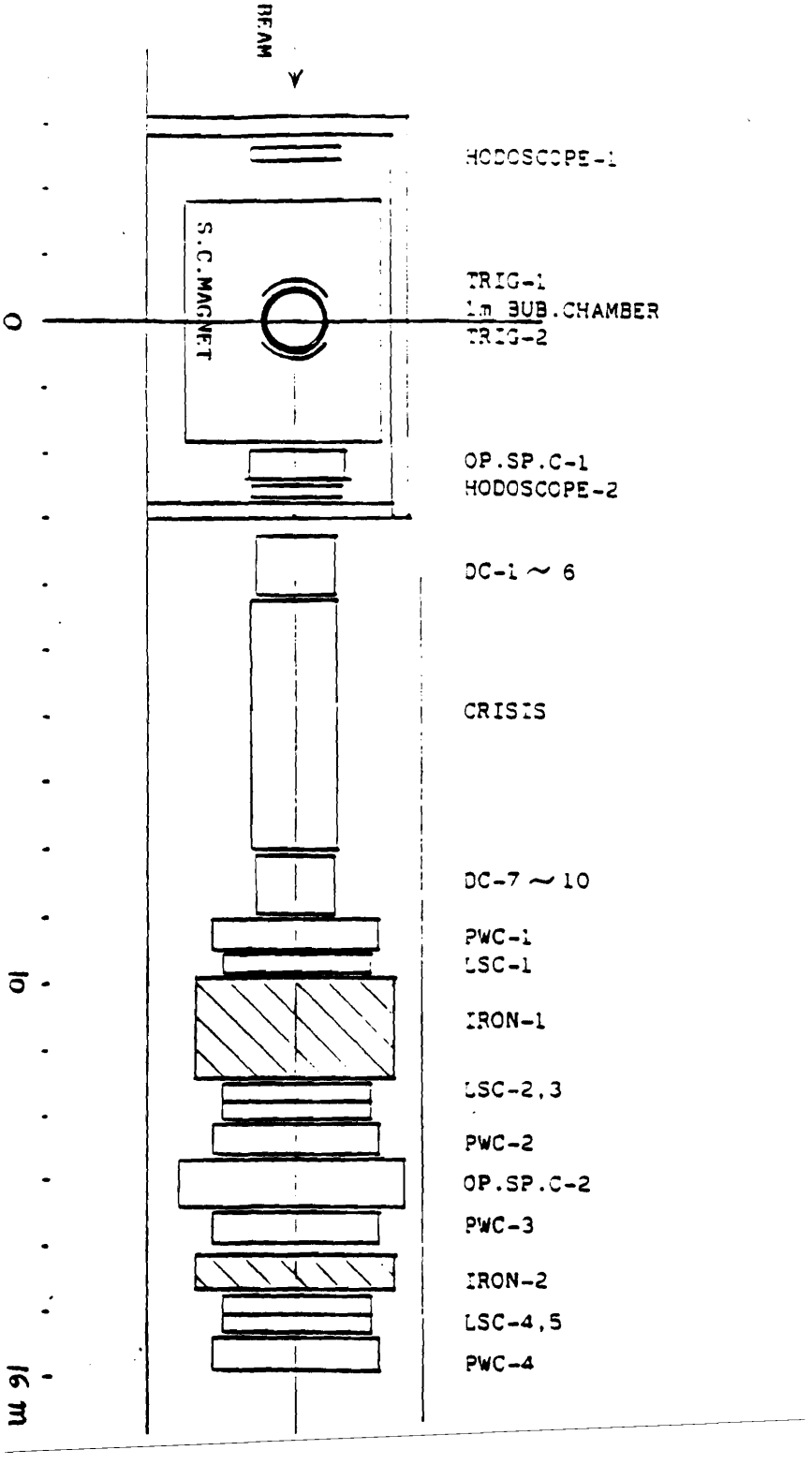
T. Kinnel, U. Wisconsin., Measurement of Primordial P_T, exp. 1992.

E-745


BEAM
HODOSCOPE-1
S.C.MAGNET
TRIG-1
1m BUB.CHAMBER
TRIG-2
OP.SP.C-1
HODOSCOPE-2
DC-1 ~ 6
CRISIS
DC-7 ~ 10
PWC-1
LSC-1
IRON-1
LSC-2,3
PWC-2
OP.SP.C-2
PWC-3
IRON-2
LSC-4,5
PWC-4
0
10
16 m

E-745 (Kitagaki) Neutrino Experiment Using the One-Meter High-Resolution Bubble Chamber

Brown, Fermilab, IHEP/Beijing (PRC), Indiana, MIT, Nagoya (Japan), ORNL, Tennessee, Tohoku (Japan), Tohoku Gakuin (Japan)

Status: *Data Analysis*

E-745 is the muon neutrino experiment using the Tohoku high-resolution one-meter freon bubble chamber. High spatial resolution of ~70 μm is obtained by the holographic optics. Physics aims are (a) studies of neutrino interactions in the high Q^2 region, (b) studies of charm and heavy quarks, and (c) new phenomena, e.g. tau neutrino events.

During the 1985 and 1987 fixed-target runs, 200,000 and 360,000 pictures were taken, respectively. All events have been analyzed and physics analysis is underway.

E-745 Publications

"A New Method to Investigate the Nuclear Effect in Leptonic Interactions," T. Kitagaki et al., Proceedings Int. Conf. on Neutrino Physics and Astrophysics, Boston, June 1988.

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"A High Resolution Holographic Freon Bubble Chamber for the Fermilab High Energy Neutrino Experiment," T. Kitagaki et al., Nucl. Inst. and Meth. A281, 8 (1989).

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"High Energy Neutrino Interactions, E-745," J. Harton, Ph.D. Thesis, MIT, May 1988.

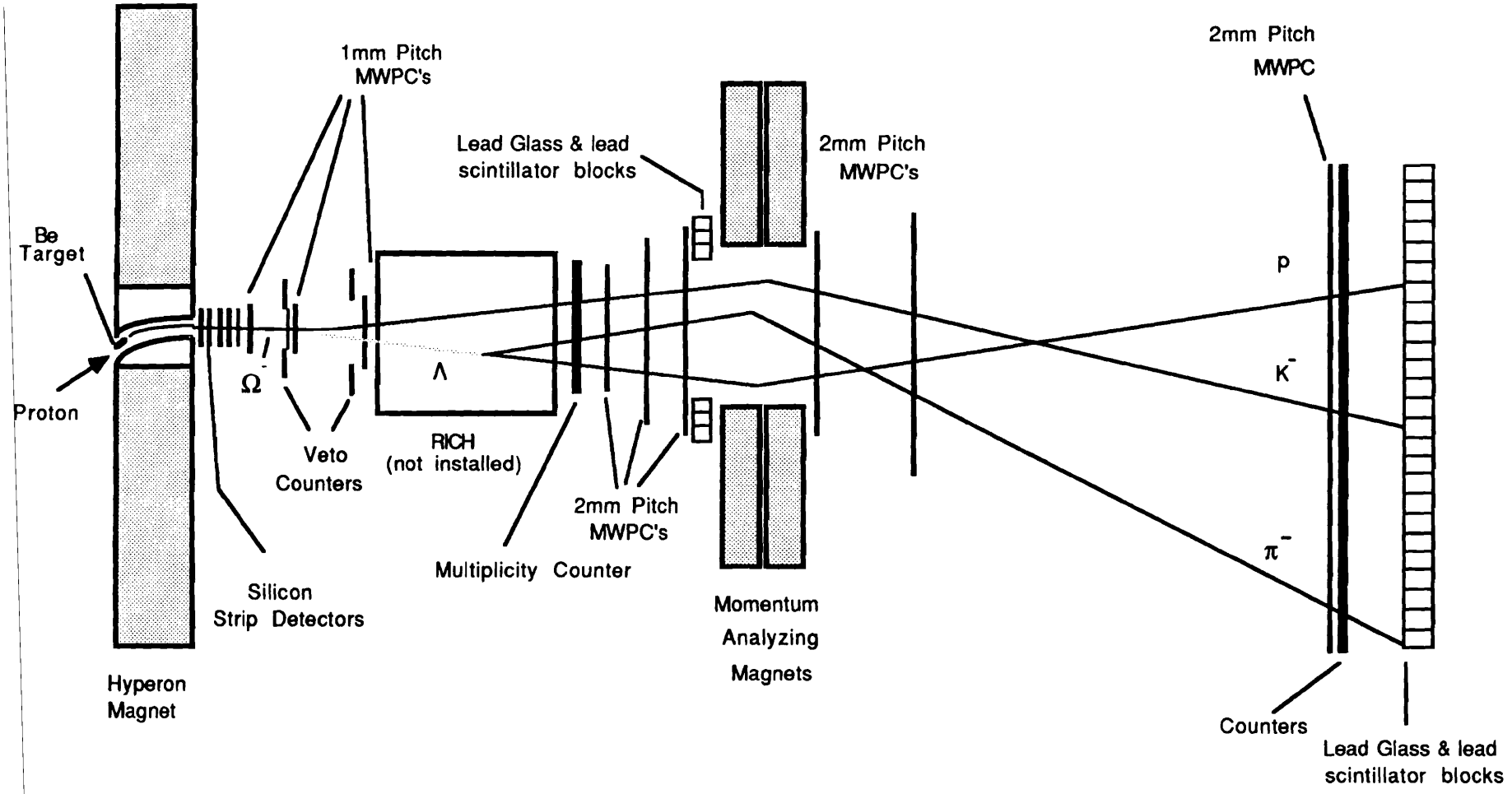
"Vector Meson Production, E-745," J. Shimony, Ph.D. Thesis, University of Tennessee, June 1988.

"Strange Particle Production, E-745," K. De, Ph.D. Thesis, Brown University, June 1988.

"$\nu_\mu - \nu_\tau$ Oscillation Limit, E-745," H. Suzuki, Master Thesis, Tohoku University, March 1989.

"Gluon Jet Analysis, E-745," M. Sasaki, Ph.D. Thesis, Tohoku University, March 1990.

"Bose-Einstein Effect, E-745," H. Kawamoto, Master Thesis, Tohoku University, March 1990.



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, Ml, with a curved channel inside. Ml 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 Ml 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^-.

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 were detected. 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.

Data taking of E-756 was completed in the 1987-1988 fixed-target run. Approximately 0.2 billion triggers were logged onto magnetic tapes. Data crunching for three charged track events was done in 1989, yielding the

world's largest samples of Ξ^-, Ω^-, $\bar{\Xi}^+$and $\bar{\Omega}^+$. In 1990, all single track events were also processed. In 1991, the data analysis of the Ξ^- and Ω^- was completed.

To date, the most intriguing result from E-756 is the discovery of non-zero $\bar{\Xi}^+$ production polarization. Models that explain hyperon polarization predict no polarization for $\bar{\Xi}^+$ and Ω^-. Indeed, with more than 100,000 events at $\langle x_f \rangle = 0.46$ and $\langle p_t \rangle = 0.89$ GeVtc, we found that the average Ω^- polarization was $-0.01 \pm 0.010 \pm 0.010$, as shown in Figure 1. But we measured a mean $\bar{\Xi}^+$ polarization of $0.097 \pm 0.012 \pm 0.009$ at $\langle x_f \rangle = 0.39$ and $\langle p_t \rangle = 0.76$ GeV/c, comparable to that of Ξ^- (see Figure 2). With this polarized sample of $\bar{\Xi}^+$'s, the magnetic moment of an antihyperon was determined for the first time. The magnitude of the $\bar{\Xi}^+$ magnetic moment, $0.657 \pm 0.028 \pm 0.020$ n.m., is consistent with that of Ξ^-, as required by CPT invariance.

The polarization of Ξ^- and Ω^- produced by a polarized neutral hyperon beam is shown in Figure 3. The magnitude of the polarization increases as a function of the hyperon momentum. In addition, the μ_{Ξ^-} and μ_{Ω^-} were found to be -0.6505 ± 0.0025 n.m. and $-1.94 \pm 0.17 \pm 0.14$ n.m. respectively.

E-756 Publications

"Production Polarization and Magnetic Moment of $\bar{\Xi}^+$ Antihyperons Produced by 800 GeV/c Protons," P. M. Ho et al., Phys. Rev. Lett. 65, 1713 (1990).

"Measurement of the Ω^- Magnetic Moment," H. T. Diehl et al., Phys. Rev. Lett. 67, 804 (1991).

"Polarization of Ξ^- Hyperons Produced by 800 GeV Protons," J. Duryea et al., Phys. Rev. Lett. 67, 1193 (1991).

"Precise Measurement of the Ξ^- Magnetic Moment," J. Duryea et al., accepted for publication, Phys. Rev. Lett. (1992).

E-756 Theses

"Omega Minus Polarization and Magnetic Moment", H. T. Diehl, Ph. D. thesis, Rutgers University (1990).

"Production Polarization and Magnetic Moment of $\bar{\Xi}^+$ Antihyperons Produced by 800 GeV/c Protons," P. M. Ho, Ph. D. thesis, University of Michigan (1990).

"A Precision Measurement of the Polarization and Magnetic Moment of the Cascade-Minus Hyperon," J. W. Duryea, Ph.D. thesis, University of Minnesota (1991).

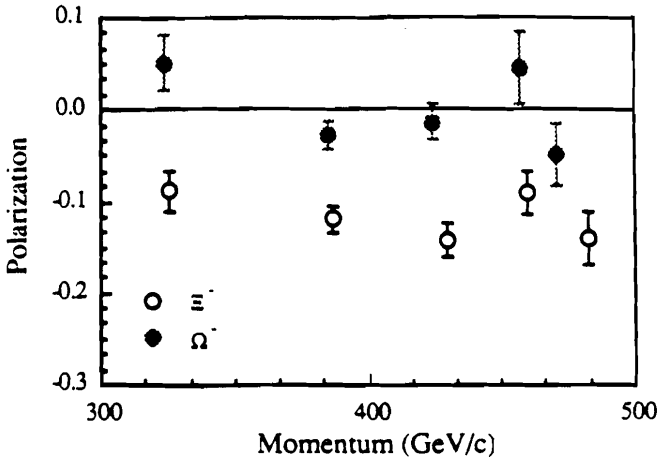


Figure 1. Polarization of Ξ^- and Ω^- produced by protons.

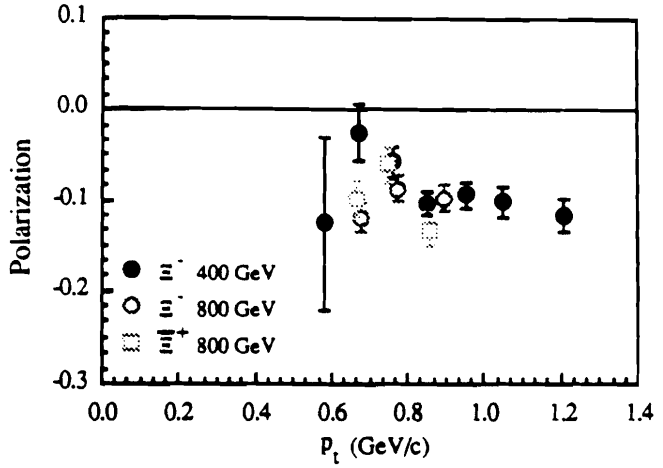


Figure 2. Polarization of Ξ^- and $\bar{\Xi}^+$ produced by protons.

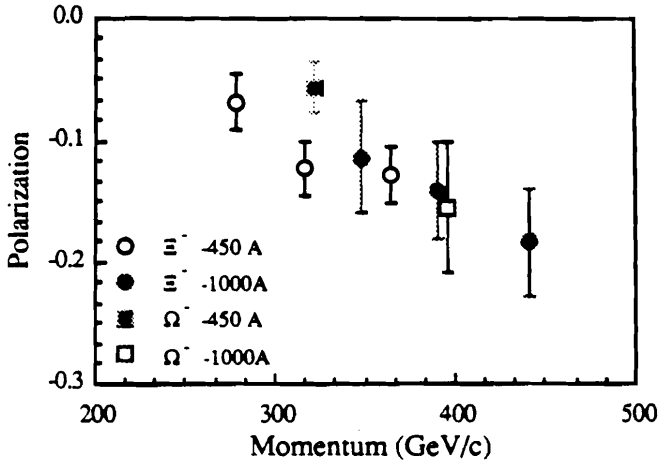
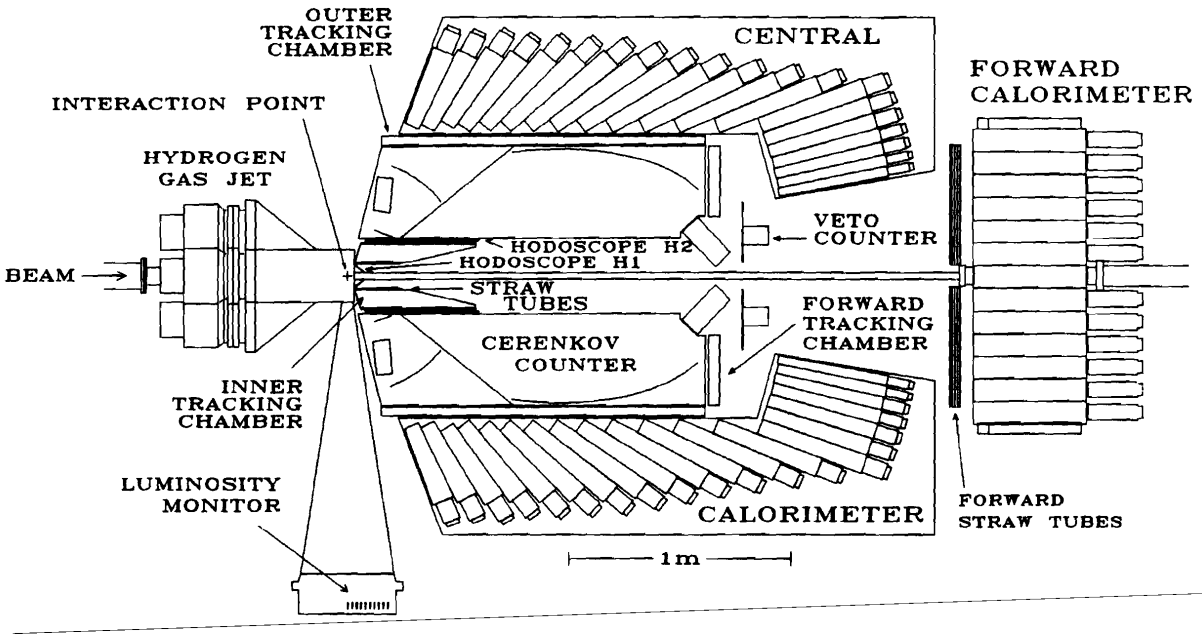


Figure 3. Polarization of Ξ^- and Ω^- produced by polarized neutral hyperons.

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 (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)

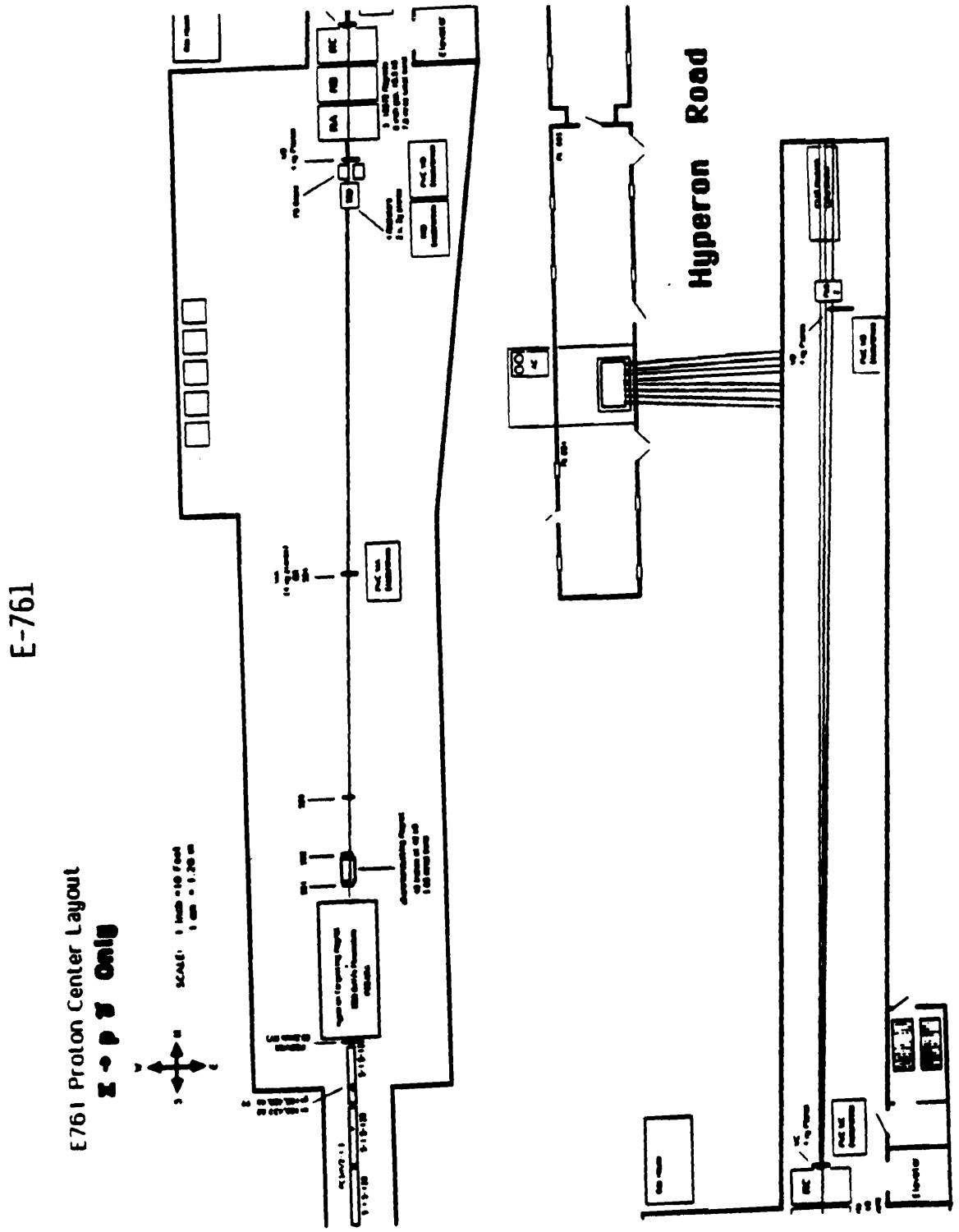
Status: *Data Analysis*

Experiment E-760 studies charmonium states formed in $\bar{p}p$ collisions. A cooled antiproton beam of up to $4x10^{11}$ $\bar{p}$'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 $\Delta p/p = 2x10^{-4}$ 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 submitted for publication. 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 $\bar{p}p \rightarrow {}^1P_1 \rightarrow J/\psi\,\pi^0 \rightarrow e^+e^-\gamma\gamma$.

A proposal (P-835) has been submitted for another run which will concentrate on finding the η_c', making precision measurements of the η_c, measuring the $\gamma\gamma$ decay rate of the χ_0 and searching for the undiscovered D states.


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), SPNPI (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 BM 109 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.

We feel that the 1990 fixed target run allowed us to gather sufficient data to reach all of the above goals. In addition we have data with which we can:

Compare $d\sigma/dt$ for Σ^+ and anti (Σ^+) production
Compare $d\sigma/dt$ for Ξ^- and anti (Ξ^-) production
Measure the polarization as a function of t for Σ^+ and anti (Σ^+) production
Make a precise measurement of Σ^+ magnetic moment
Measure the anti (Σ^+) magnetic moment (if it is polarized)
Measure the anti ($\Sigma^+ \rightarrow p\gamma$) rate
Measure the Σ^+ magnetic moment using crystal channeling

Shown in the figure is a histogram with all of the $\Sigma^+ \rightarrow p\gamma$ data taken during the run. The minimum photon trigger was used here. Note the size of the sample ($>10^6$ events in some bins) and the clear signal at the photon mass. The second histogram shows a subset of the above with information from the TRD and lead glass/BGO calorimeter incorporated.

A paper is in preparation to send to Physical Review Letters; Fermilab-Conf-91/112 is a report of a 1991 Moriond talk on α from $\Sigma \rightarrow p\gamma$. Other talks have been given at the 1991 Washington APS Meeting and the Vancouver DPF Meeting.

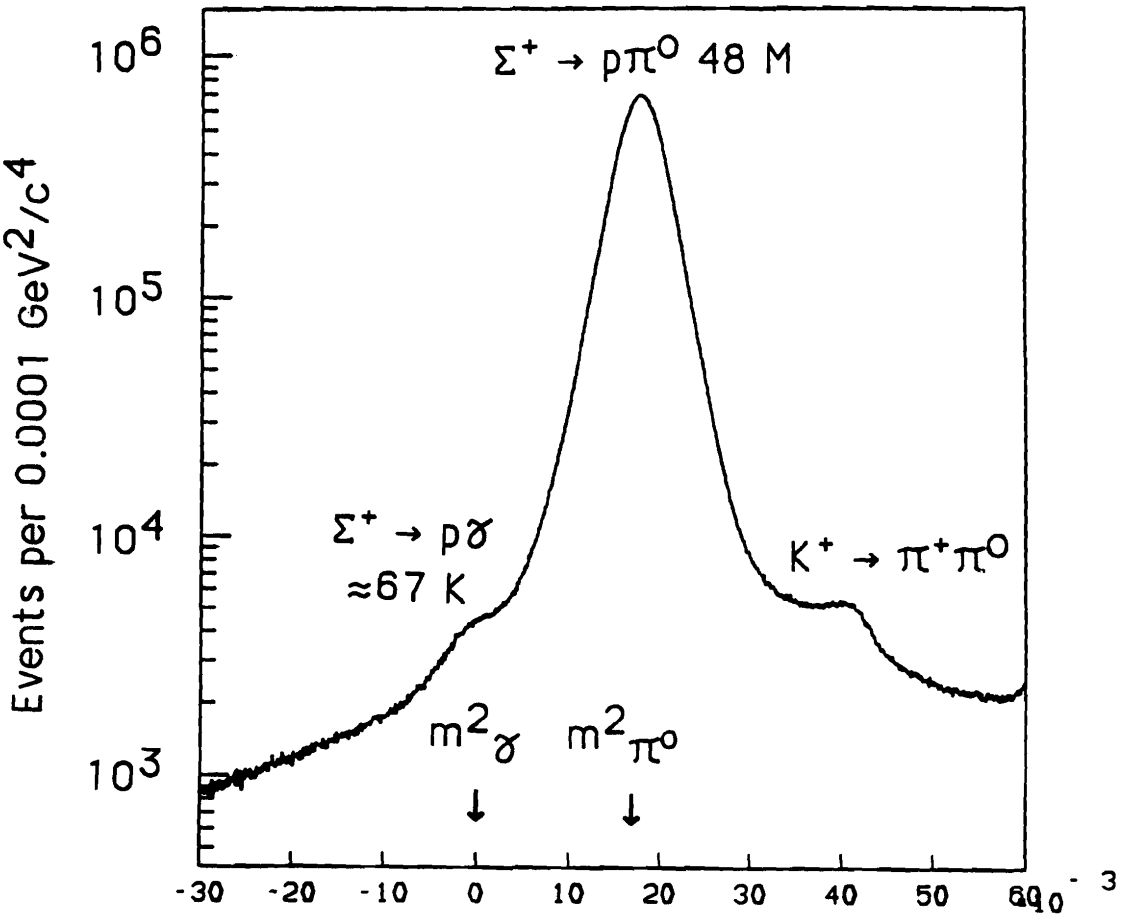


Figure 3: m^2_x distribution, $\Sigma^+ \to p + X$ (GeV^2/c^4)

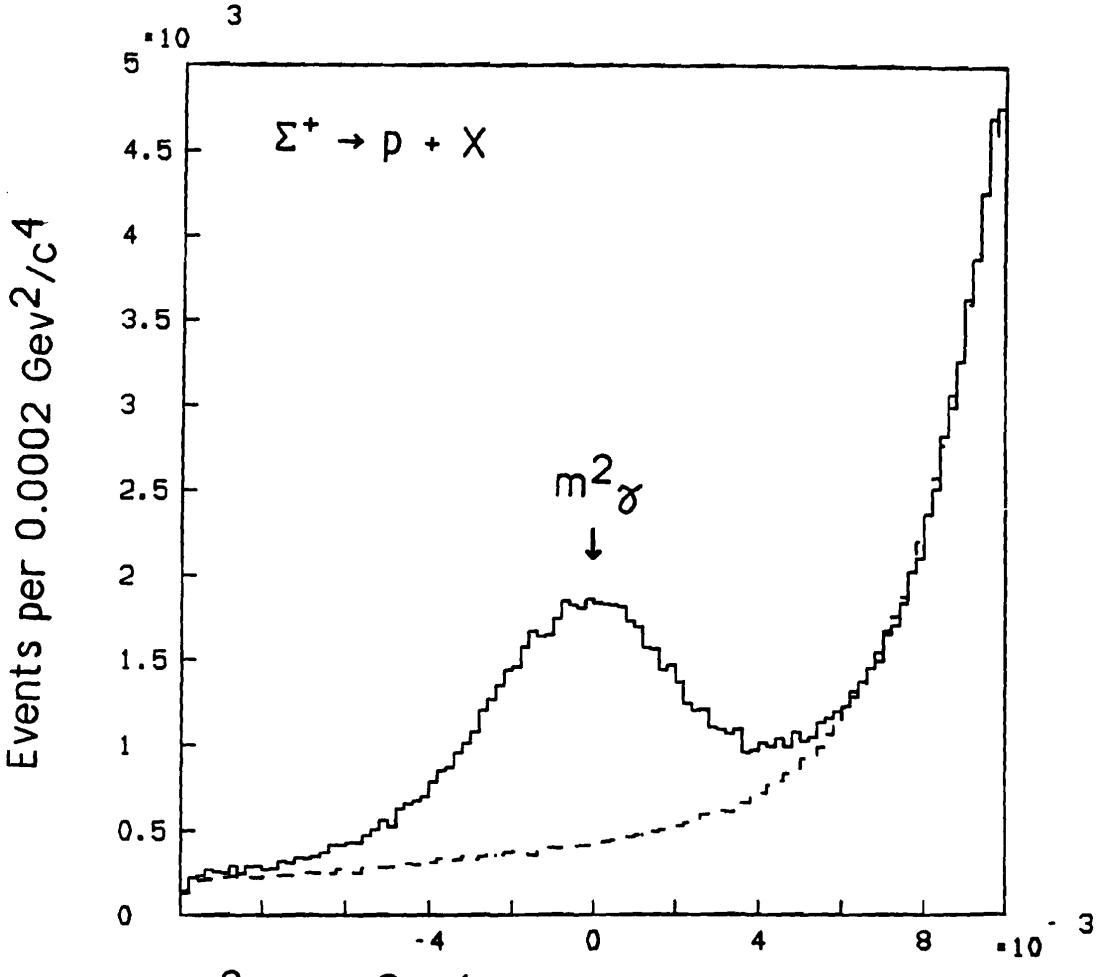
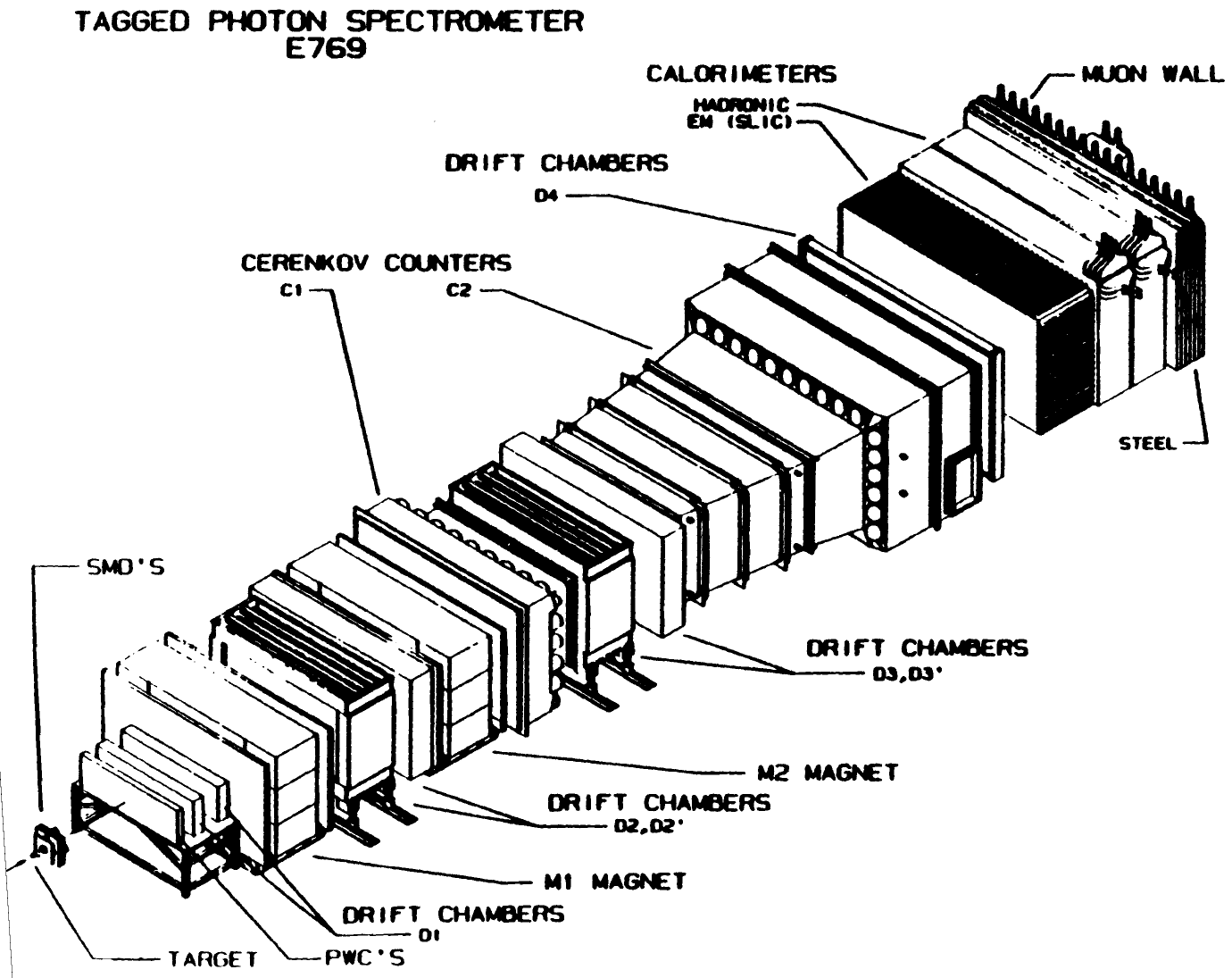


Figure 4: m^2_X (Gev^2/c^4) signal and background(dashed)


TAGGED PHOTON SPECTROMETER
E769
CALORIMETERS
HADRONIC
EM (SLIC)
MUON WALL
DRIFT CHAMBERS
D4
CERENKOV COUNTERS
C1
C2
STEEL
SMD'S
DRIFT CHAMBERS
D3,D3'
M2 MAGNET
DRIFT CHAMBERS
D2,D2'
M1 MAGNET
DRIFT CHAMBERS
D1
TARGET
PWC'S

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

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

Status: *Data Analysis*

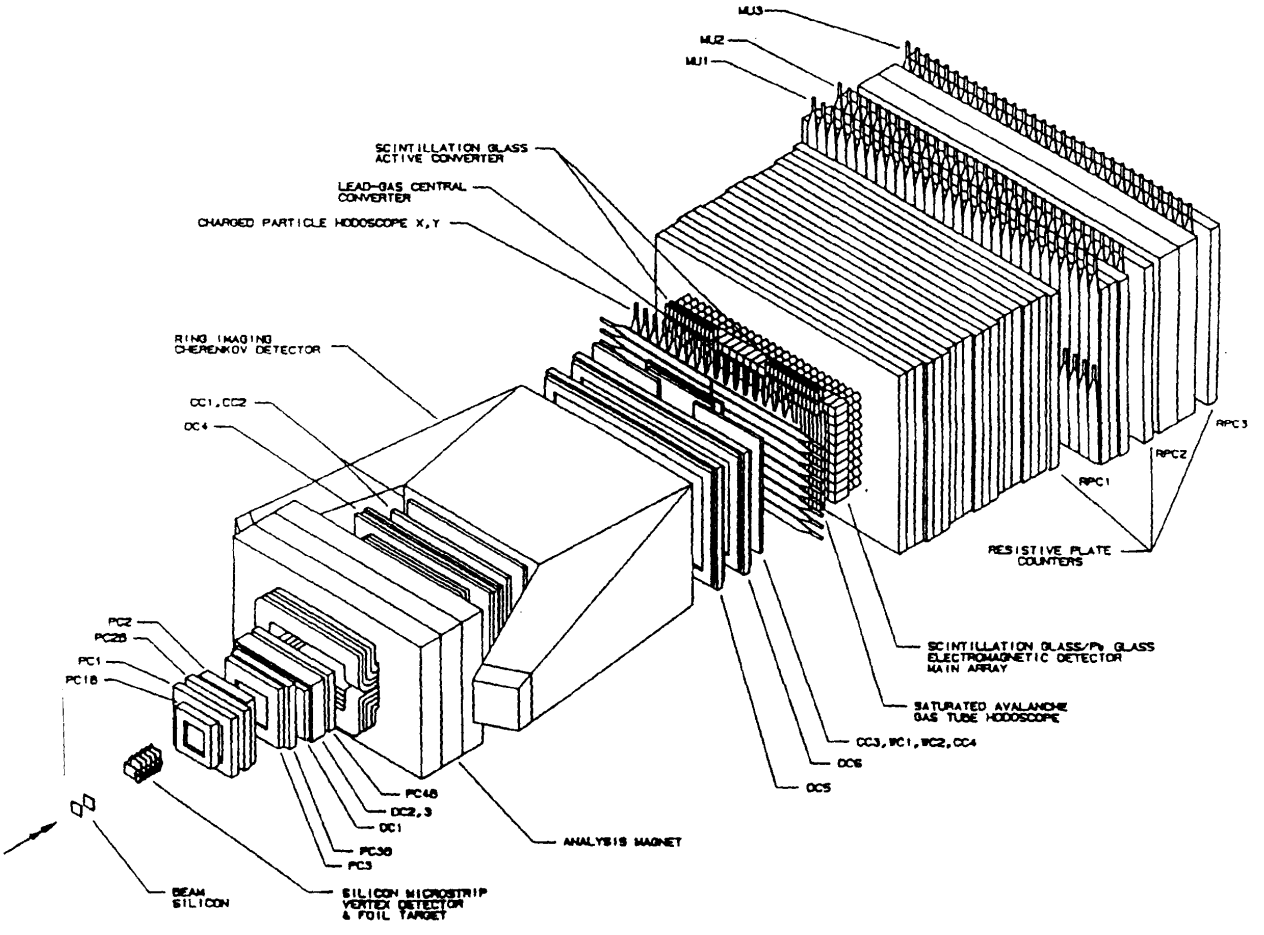
E-769 is an experiment to measure the properties of hadronic charm production using the Tagged Photon Spectrometer facility. It measures the flavor, x, p_t and A dependences of this process at the same time and in a single apparatus. High statistics lifetime measurements of several charm states are expected.

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.

Preliminary results from the experiment have been presented at several conferences and the first results based on the full data sample are in preparation for submission to refereed journals. Three Ph.D. theses based on data from E-769 have been accepted. A total of twelve 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-Taking*

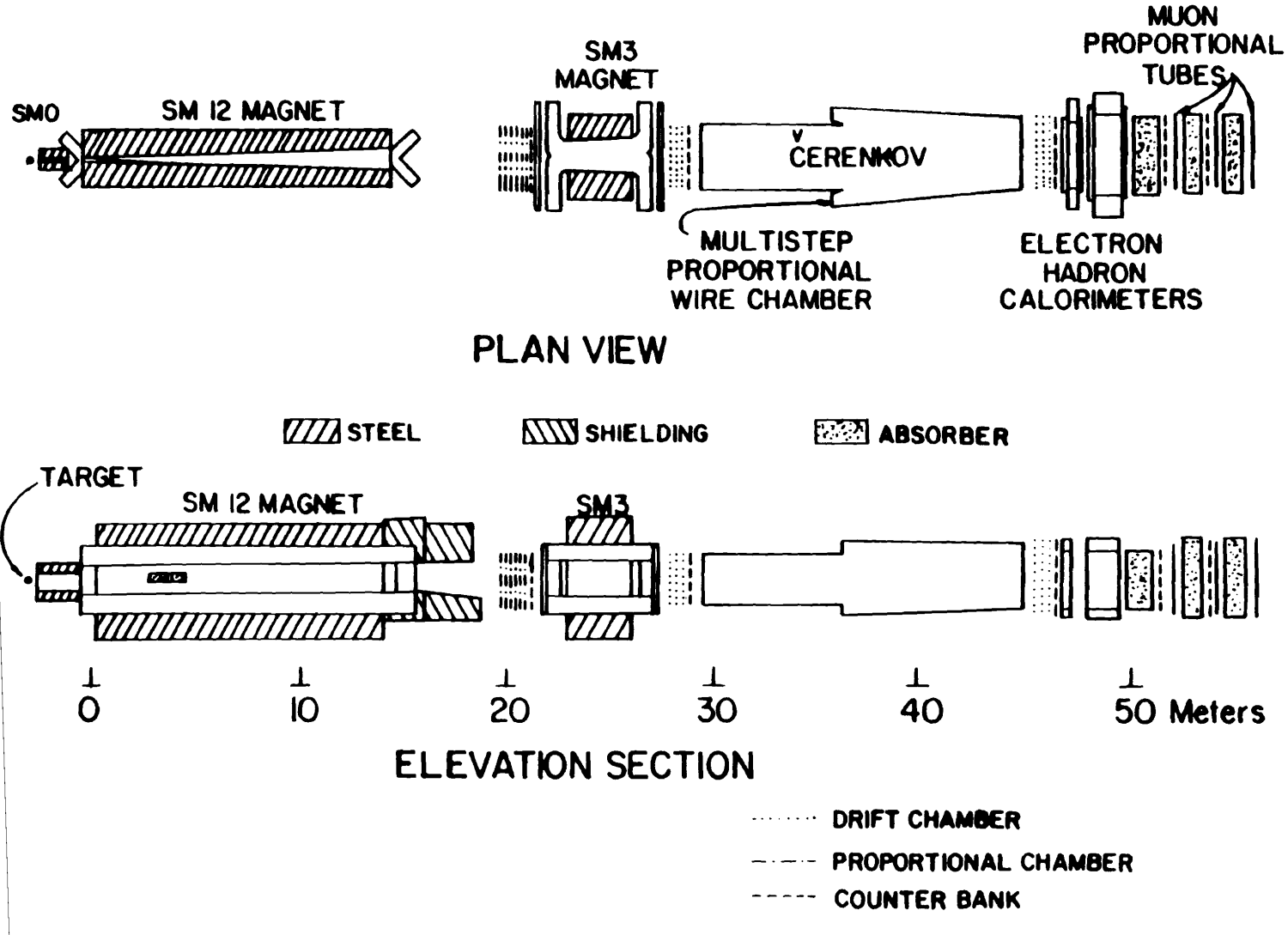
The presence of muons in final states produced in hadronic interactions has proved to be a valuable indicator that interesting hard physics processes have taken place. Experiment E-771 will use both high P_t single muons and high-mass muon pairs as a signature that events are possible beauty production 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:

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

$$B. \quad pW \rightarrow \bar{B}^\circ B^\circ + X$$
$$\downarrow \quad \downarrow \rightarrow \textit{anything}$$
$$\downarrow \rightarrow \mu^- + \bar{\nu} + \textit{anything}$$

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 was 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.

E-772 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), "Production of Low-Mass Dihadrons in 800 GeV pW Interactions."

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."

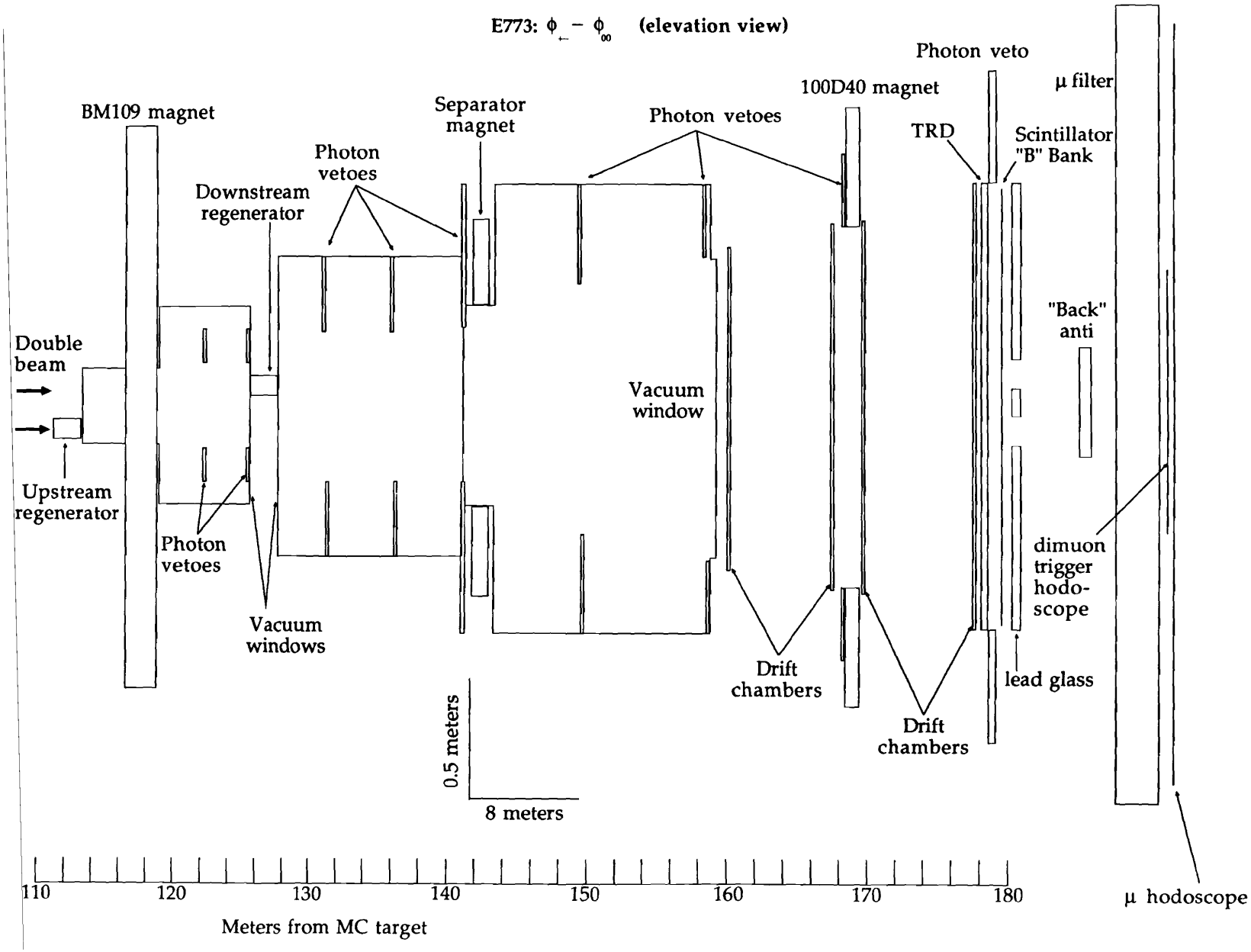
E-772 Articles currently in preparation

D. M. Alde et al., submitted to PRL, "Nuclear Dependence of the Production of Upsilon Resonances at 800 GeV."

M-J. Wang et al., to be published in PRD, "Nuclear Effects in Dimuon Production at 800 GeV/c."

E-772 Theses

Ming-Jer Wang, Case Western Univ. (Masters theses, Northern Illinois Univ.: Rhungsheng Guo, Tony Jackson)


E773: $\phi_{\leftarrow} - \phi_{\infty}$ (elevation view)
BM109 magnet
Separator magnet
Photon vetoes
100D40 magnet
Photon veto
μ filter
TRD
Scintillator "B" Bank
Photon vetoes
Downstream regenerator
Photon vetoes
"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
110
120
130
140
150
160
170
180
Meters from MC target
μ hodoscope

E-773 (Gollin) Measurement of the Phase Difference Between η_{00} and η_{+-} to a Precision of $1/2^0$

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

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

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. The value listed by the Particle Data Group is $(2 \pm 5)^o$; the goal of E-773 is to measure $\Delta\varphi$ to an accuracy of $1/2^o$.

To avoid systematic uncertainties associated with imperfect knowledge of kaon beam flux, detector acceptance, and resolution smearing effects, the experiment measures $\pi\pi$ decays using a double beam technique similar to that employed by E-731. 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 $\pi^o\pi^o$ 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 are recorded simultaneously for $\pi^o\pi^o$ 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 1% 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 shown in the accompanying figure. It is similar to the E-731 detector downstream of the two regenerators, with the addition of a transition radiation detector after the last drift chamber and a dimuon trigger hodoscope after the muon filter. Both regenerators are solid scintillator to reduce backgrounds from inelastic K_S production. The $\pi^o\pi^o$ 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.

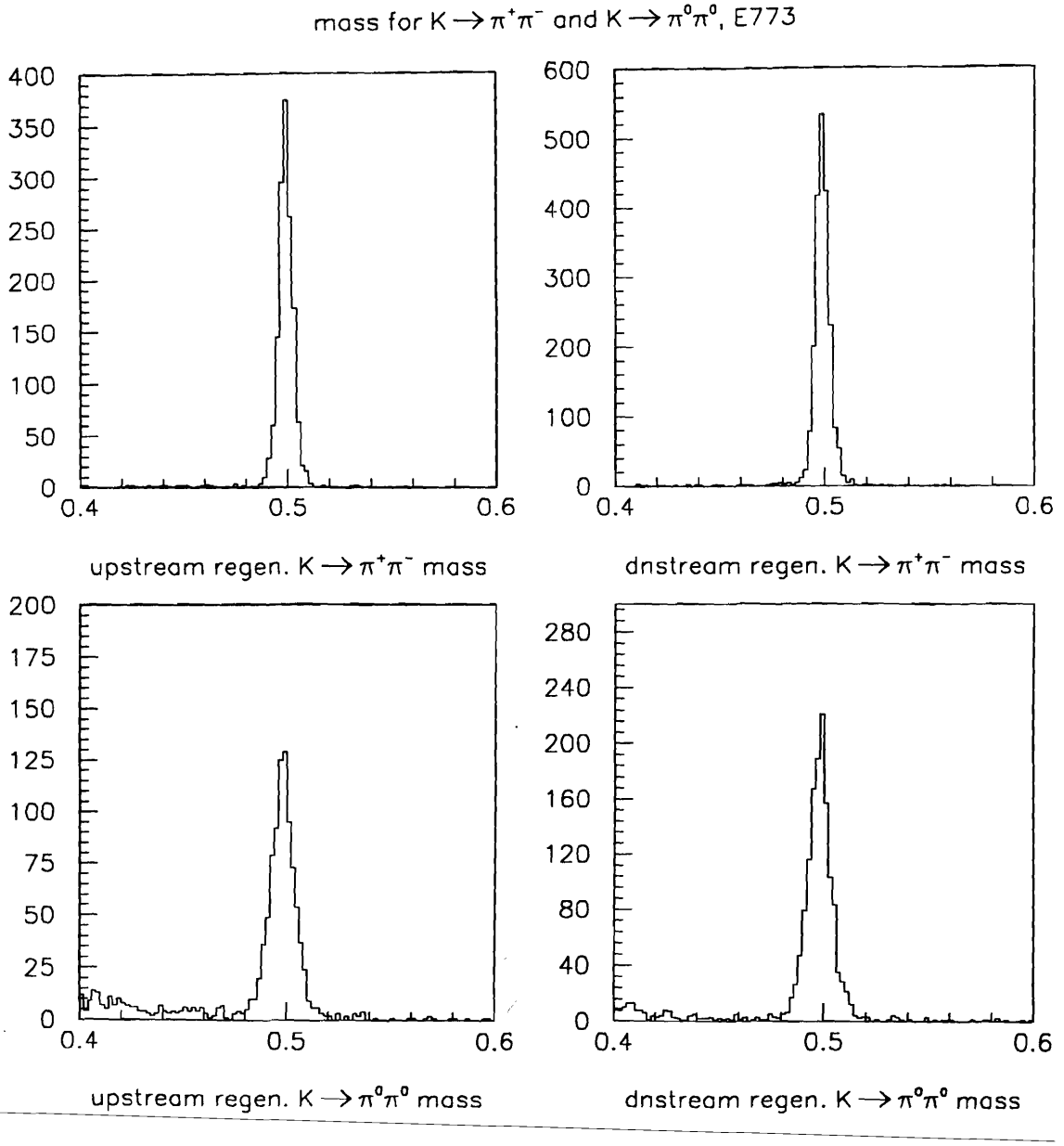
We expect to record more than 200,000 $K \rightarrow \pi\pi$ decays from each beam during the 1991 run, yielding an anticipated measurement accuracy of $1/2^o$ for $\Delta\varphi$.

Systematic uncertainties limit the precision of an E-731-style experiment which measures the phase difference between η_{00} and η_{+-} to be about 1.5 degrees. Sources of systematic error include the different decay z distributions of K_L and K_S, resolution effects, and ignorance of the value of ε'. Most of these problems are avoided by E-773, which has a pair of K_S beams created by regenerators spaced along the beam direction by about 12 meters. The relative thicknesses and separations of the regenerators are tuned to produce decay spectra which are nearly identical inside the fiducial decay volume for both beams. The estimated statistical error for the 1991 run is about 0.5°; the systematic uncertainty should be less than 0.2°.

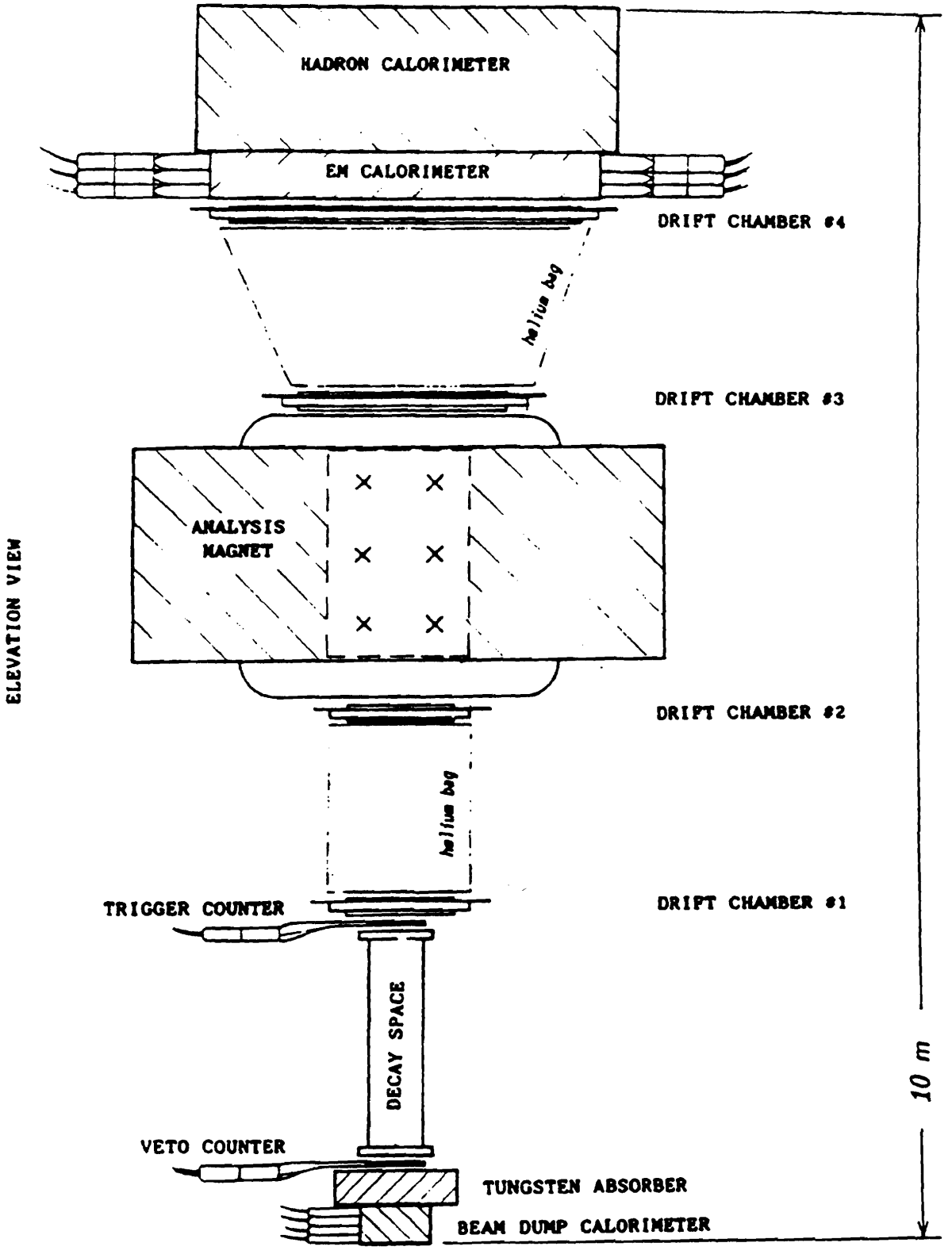
The E-773 spectrometer is based on the E-731 detector with modifications and new hardware as appropriate. To reduce possible backgrounds from inelastic K_S production, E-773 uses solid scintillator regenerators which switch beams after every machine spill. The downstream regenerator was built by the Chicago group, the upstream regenerator by the Fermilab group. Moving machines, controllers, and additional lead/lucite photon antis near the regenerators were built in Urbana. These were installed in 1990 and tested during short engineering runs before the summer shutdown. A TRD and recirculating xenon gas system for E-799 were built by the Chicago and Fermilab groups and partially installed in 1991. Data from E-773 has provided performance information about this system. A processor to veto $\pi^+\pi^-$ triggers with bad track topologies was built at the University of Chicago and installed during the 1991 run. A dimuon trigger hodoscope and logic box, built in Urbana, were installed for use in forming a $\pi^0\mu^+\mu^-$ trigger. We replaced our PDP-11 data acquisition system with one based on PANDA; the new DA system tripled the number of events per spill we could write to tape.

E-773 took data during the first half of the 1991 fixed-target run. We brought all detector systems online in six weeks, and began writing physics-quality data in late July. We wrote 1200 8mm cassettes of data by the time we ended our run September 30th. We have roughly 500,000 $\pi\pi$ events on tape, distributed among the four beam/final state combinations. Shown in the figures are plots of the $\pi\pi$ mass from a small sample of data tapes written during the run.

Data from four hours of running: E773



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
10 m
ELEVATION VIEW

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.

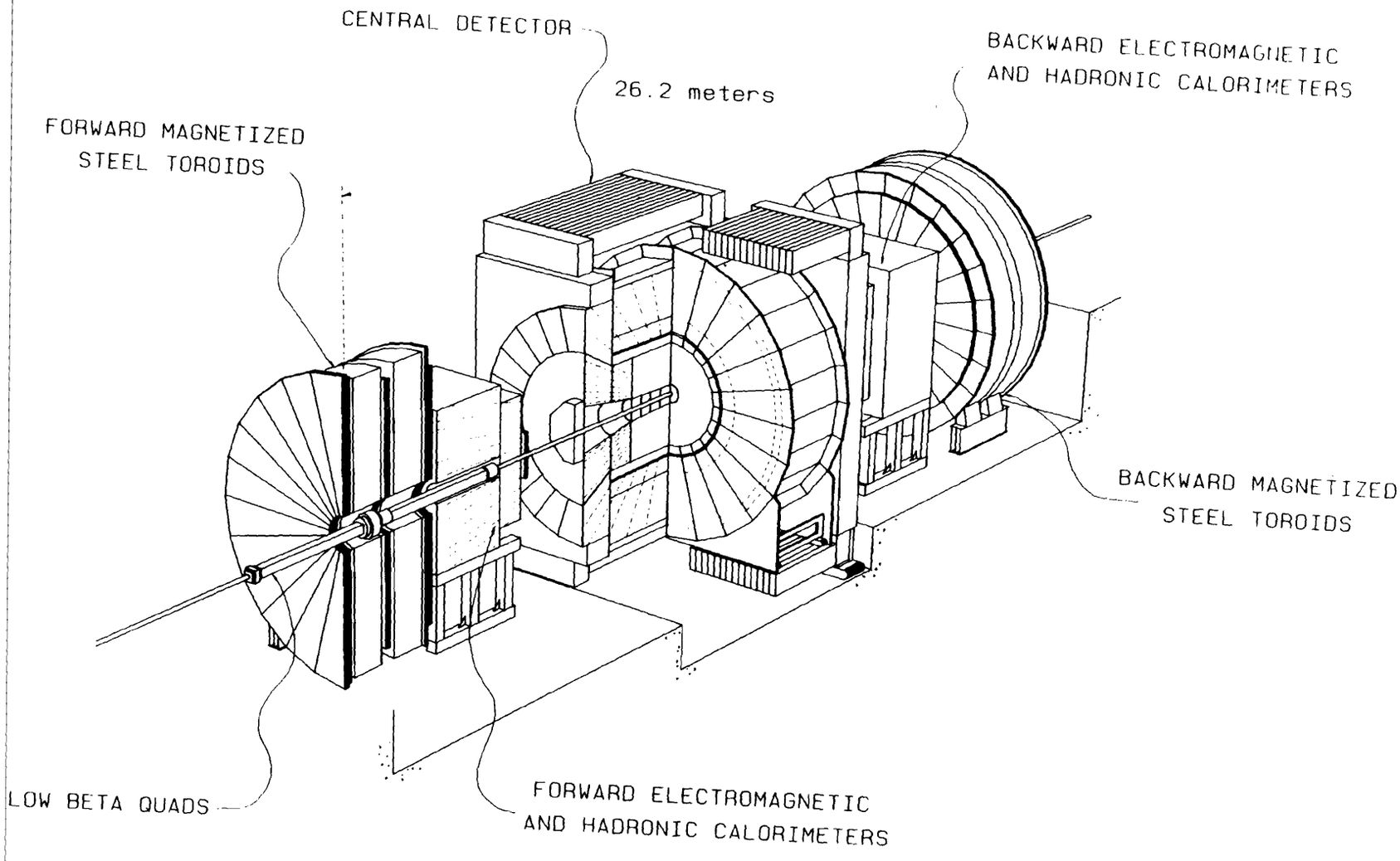
During the 1987-88 fixed-target run, E-774 completed engineering tests and obtained a preliminary data sample representing 1% of our proposed beam on target. The experiment, using a 275 GeV electron beam, was sensitive to particles up to 10 MeV/c^2 in mass and down to 4×10^{-16} sec in lifetime. None 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.

E-774 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-775


CENTRAL DETECTOR
26.2 meters
BACKWARD ELECTROMAGNETIC
AND HADRONIC CALORIMETERS
FORWARD MAGNETIZED
STEEL TOROIDS
BACKWARD MAGNETIZED
STEEL TOROIDS
LOW BETA QUADS
FORWARD ELECTROMAGNETIC
AND HADRONIC CALORIMETERS

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

ANL, Brandeis, Chicago, Duke, Fermilab, Harvard, Illinois, INFN/Frascati (Italy), INFN/Pisa (Italy), Johns Hopkins, KEK (Japan), LBL, Michigan, MIT, Osaka City (Japan), Padova (Italy), Pennsylvania, Pittsburgh, Purdue, Rochester, Rockefeller, Rutgers, SSCL, Texas A&M, Tsukuba (Japan), Tufts, UCLA, Wisconsin

Status: *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 made possible by the Tevatron I project. It consists of a central magnetic detector that covers the angular range of 10° to 170° with respect to the incident proton direction and two forward/backward detectors that cover the ranges 2° to 10° and 170° to 178°, respectively. The basic goals of the detector include: 1) the measurement of electromagentic and hadronic energy flow in fine bins of rapidity and azimuthal angle over the entire angular range of CDF with uniform granularity using systems of shower counters and hadron calorimeters, 2) measurements of the directions of charged particles to angles as close to the incident beam directions as technically possible, 3) momentum analysis of charged particles over the angular range 15°to165°, and 4) identification and momentum analysis of muons over the angular ranges 3° to 16°, 40° to 140°, and 164° to 177°.

The major detector components are:

1. Central detector solenoid magnet with superconducting coil.

2. Charged particle tracking system organized into a central tracking chamber for momentum analysis, an upgraded set of vertex time projection chambers to find event topologies, and precision silicon vertex detectors.

3. Electromagnetic shower counters covering the full angular acceptance of CDF for identifying photons and electrons. There are three subsystems of shower counters, Central, End Plug, and Forward.

4. Hadron calorimeters backing up the shower counters. In addition to the three regions covered by the shower counters, the end wall of the solenoid magnet is instrumented with hadron calorimeters.

5. Muon detectors. The central muon system is behind the central and endwall hadron calorimeters; the forward system includes magnetized iron toroids for momentum measurements.

6. Front-end, trigger, and data acquisition electronics systems and online computers for selecting events, recording data, and monitoring all of the detector systems.

7. Beamline equipment including luminosity monitors.

E-778 (Gerig / Talman) An Experimental Study of the SSC Magnet Aperture Criterion

CERN (Switzerland), Cornell, Fermilab, Houston, SLAC, SSCL

Status: *Data Analysis*

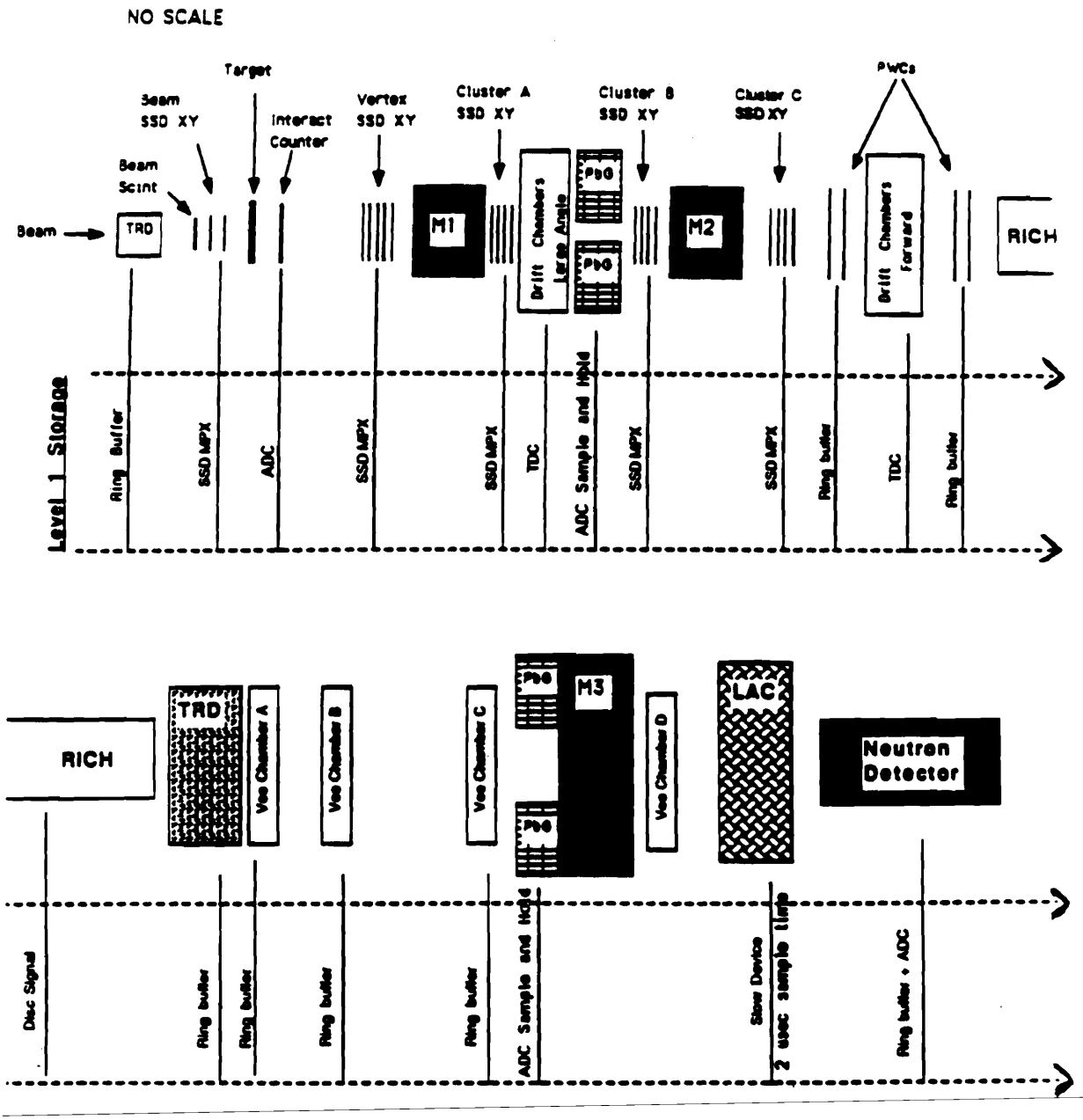
The field quality specification of the main bending magnets in the SSC is based on the imposition of bounds to the departure from linear behavior in the oscillation of single particles about their closed orbits. This is physically reasonable, and has the advantage that it can be applied to accelerator designs using any of a number of existing computer codes. One of several parameters in the specification is "smear." If the betatron oscillations of a particle are linear, and if there is no coupling between the two transverse degrees of freedom, then the horizontal and vertical oscillation amplitudes are constants of the motion. A plot, from turn to turn, of one amplitude versus the other will yield a single point. In general, magnetic field nonlinearities lead to gradual (on the betatron wavelength scale) changes in transverse amplitudes, and the single point of the turn-by-turn plot develops into an area. Smear is the fractional excursion in the size of this area.

The Tevatron normally exhibits excellent linear behavior. Strong sextupoles are deliberately turned on during the experiment in order to introduce phase space distortions at up to the 20% level, at amplitudes of 5 millimeters. Experimental data taken in 1989 show good agreement between measurement and prediction of the nonlinear deviation of phase space motion. They also confirm that the Tevatron performs satisfactorily when its optics are distorted beyond the SSC design specification.

The most recent data taking run, in January 1991, concentrated on two beam dynamics topics which are natural extensions of the original definition of E-778 as a study of the SSC Magnet Aperture Criterion. The first topic is the effect that tune modulation has upon the persistent turn-by-turn signal that results when part of a kicked proton beam is trapped inside a resonance island. The data taken are being compared with a detailed theoretical model of expected behavior that is parameterized by only two numbers, the local slope of tune with amplitude, and the island tune. The second topic is a phenomenological investigation into the effect of nonlinearities, in the presence or absence of resonances, on the diffusion rate as a function of oscillation amplitude. The goal is to fit the observed evolution of beam intensity and profile, when the beam has been kicked near an artificially introduced boundary, with an empirically derived diffusion function.

It is not expected that E-778 will request any more data taking run time.

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
RICH
Drift Chambers Large Angle
Drift Chambers Forward
Pb
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), CNPq (Brazil), Fermilab, IHEP/Beijing (PRC), Iowa, ITEP (Russia), SPNPI (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.

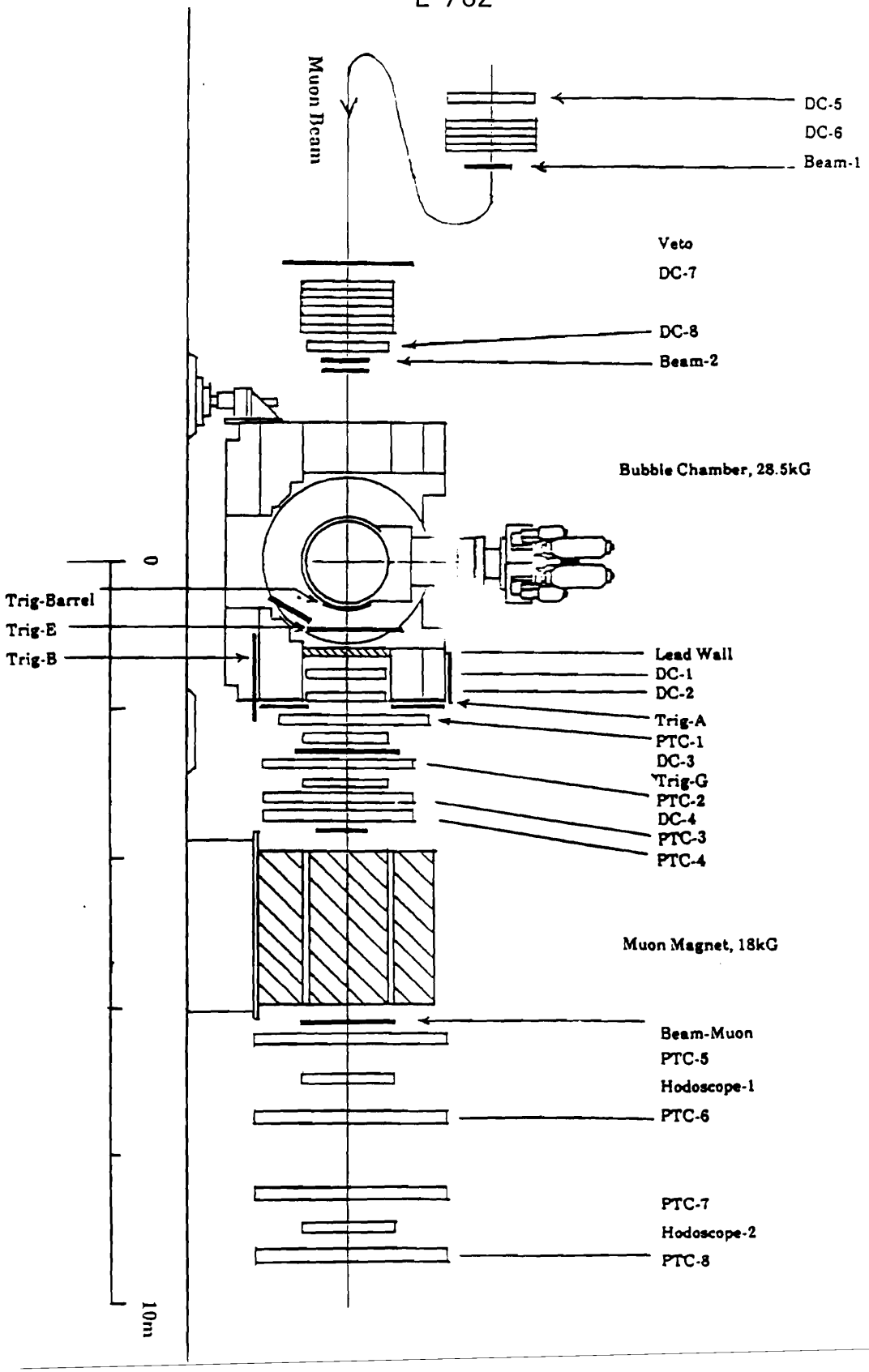
The physics questions for a charm baryon study have to do with both production and decay mechanisms. In charm baryon decays, the charm quark may decay or interact through exchange mechanisms with the light quarks. The exchange mechanisms are not suppressed by helicity considerations as they are in meson 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.

E-784 (Lockyer) Research and Development for the Bottom Collider Detector

Los Andes (Colombia), UC/Berkeley, UC/Davis, Fermilab, Florida, Illinois/Chicago, IIT, Iowa, Montreal (Canada), ORNL, Oklahoma, Pennsylvania, Prairie View A&M, Princeton, Puerto Rico, San Francisco de Quito (Ecuador), SUNY/Albany, Wisconsin, Yale

Status: *No Data Yet*

The E-784 R&D program of the Bottom Collider Detector (BCD) collaboration is aimed at detector development issues for a B-physics experiment capable of studying CP violation in the Tevatron Collider. It is hoped this ambitious physics program can begin in the next several years.

In the last year, substantial progress has been made on several areas of detector development.

1) The resolution versus angle of an AC-coupled single-sided silicon strip detector array was measured in the MT beamline. The SVXD was used for readout and results indicated good resolution at incident track angles of up to 60°. Double-sided detectors will be tested this run.

2) A first demonstration of a room temperature pixel detector, developed with collaborators at Hughes Aircraft, LBL, and SLAC, was made with minimum ionizing particles in MT. A faster readout version will be tested this summer.

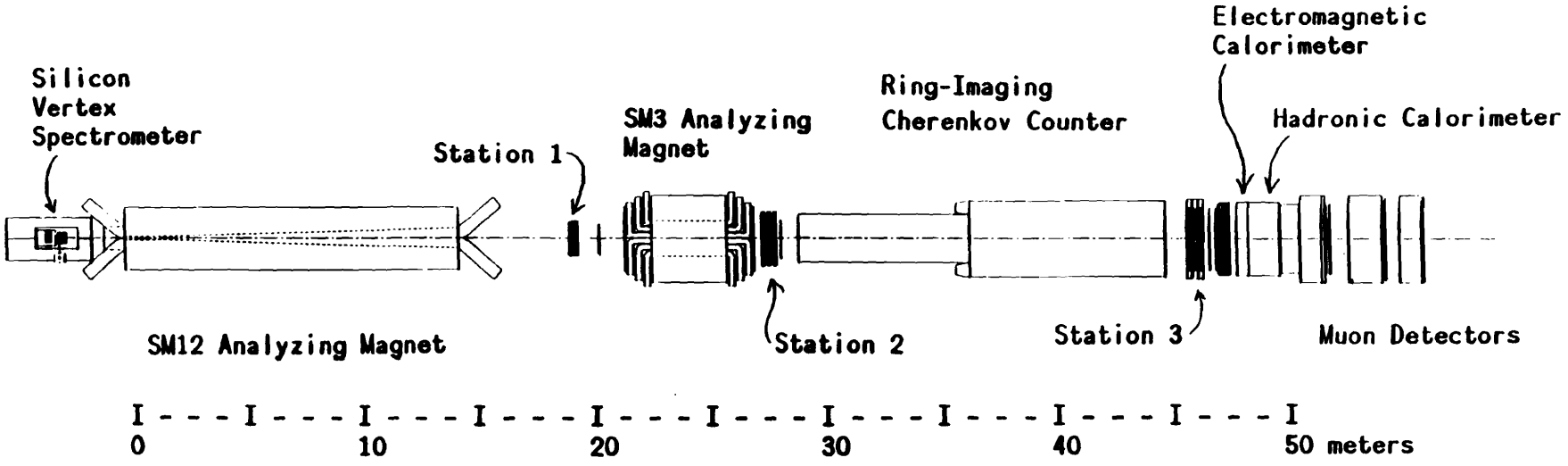
3) A next generation, 128-channel preamplifier chip with buffering and an on-board ADC per channel is being developed. "Tiny chips" have been fabricated at MOSIS and noise studies performed.

4) Mechanical/thermal tests have been performed on a 1-million channel model silicon vertex detector.

5) A several hundred straw-tube tracker with VLSI readout will be tested in MT this summer.

6) A small prototype Ring Imagine Cerenkov Counter with a "solid photocathode" and VLSI readout of a pad detector will be tested in MT this summer. Development of the photocathode and its properties continue in collaboration with D. Anderson.

7) Work continues by E. Barsotti and collaborators on an event builder switch.



E789 SCHEMATIC (PLAN VIEW)

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

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

Status: *Data-Taking*

E-789 will 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 $b \rightarrow \mu$ conversion, their observation (or non-observation) can help determine whether the Kobayashi-Maskawa (six-quark) approach to K^o 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 $b \rightarrow \mu$ 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.

Under plausible assumptions for beauty production cross sections and branching ratios to two hadrons, E-789 should record several hundred such decays per 10^{15} interactions, enough to measure the lifetime of the B_d and possibly to discover the B_s and Λ_b and measure their lifetimes and masses. These measurements are essential to evaluating the suitability of dihadronic decays for the study of CP-violation in the B system. In addition to dihadronic beauty and charm decays, E-789 will have excellent sensitivity to dileptonic modes, allowing limits of order 10^{-7} to be set on their branching ratios. These sensitivities should be achieved by the end of the 1993-94 fixed-target run.

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 23 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 1.0 cm (for a 1.1×10^{-12} sec B lifetime), a vertex cut 0.7 cm downstream of the mm-long target will retain ~ 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 ~ 0.1% at 5.3 GeV, will ensure adequate signal-to-background ratio for measurement of branching ratios as small as $\sim 10^{-6}$.

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.

E-789 had its first run in the Spring and Summer of 1990. This was a low-intensity test run at a low-mass spectrometer setting optimized for charm, for the purpose of tuning up apparatus and analysis software and studying low-multiplicity charm decays. Sufficient data were taken to see $D^\circ \rightarrow K\pi$ at the few-hundred-event level and, by prescaling the dihadron triggers and raising the beam intensity by a factor of 30, to search for dileptonic D° decays at the 10^{-5} level. As expected, trigger rate was the dominant limitation on beam intensity; upgrades of our trigger processor and data acquisition systems (now in progress) should permit up to two orders of magnitude increase in interaction rate in the 1991 run. Data were also taken on the nuclear dependence of single hadrons and pairs at intermediate P_t and mass, which constitute important backgrounds for E-789, and on the nuclear dependence of J/ψ production in the small-x_F region (complementing the E-772 data sample). We also devoted several shifts to studying rates at the beauty setting, confirming the feasibility of running at > 53MHz interaction rate. The trigger rate at the beauty setting was higher than originally estimated, due to accidental hadron pairs; this will limit our beauty sensitivity in the 1991 run to branching ratios ~ 10^{-5}. We intend to push for sensitivity at the 10^{-6} level in the 1993-94 run. Analysis of the 1990 data is in progress. We have observed a J/ψ peak and a $D^\circ \rightarrow K\pi$ peak. The D mass resolution is dominated by particle-ID ambiguity, which will be alleviated in the 1991 run through use of the RICH.

During the 1990 run detector delivery problems and the insufficient availability of electronics prevented the installation of the full vertex spectrometer; data were taken using eight silicon planes measuring in y (the magnetic-bend direction) and two stereo planes, with some 5,000 channels instrumented with new Fermilab preamplifiers plus multiwire-proportional-chamber electronics recycled from E-605/772. All sixteen silicon-strip detectors have now been delivered by Micron Semiconductor. We are building new electronics to substitute for the unavailable Fermilab discriminator/ delay/encoder system, comprising 10,000 channels of high-speed discriminator and latch; delay will be provided by existing multiconductor ribbon cable. Construction of the latches is complete. Assembly of the discriminator and cable-driver modules is in progress, with installation at Fermilab expected to begin in February 1991.

Progress has been made in returning the RICH (unused since 1984) to operation. Since the RICH photon detectors operate in the vacuum ultraviolet, the radiator gas must have oxygen and H_2O contamination well below 1 ppm.

Much work was required on the radiator gas system to eliminate leaks, and also on the system for monitoring gas transparency. To optimize the RICH performance at the energies typical of charm and beauty decay products, we will need to add 10-20% of argon to the radiator gas. The RICH gas purification system used in 1983-84 was intended for pure helium and was unable to purify argon. We tested various alternative gas purification approaches in 1990, finally settling on titanium getter pumps, which are now installed and working. Much work went into bringing up the new RICH ADC system, consisting of LeCroy 1885 FASTBUS ADCs with a custom interface to our data acquisition system. This ADC system imposed a deadtime limitation of 1 ms/event. We are decreasing the RICH readout deadtime by a factor of four by installing three additional FASTBUS crates and increasing the number of ADC modules. By the end of the 1990 run all RICH subsystems were operational, and we are confident that the RICH will operate successfully during the 1991 run.

The E-605/772 trigger processor was substantially upgraded for E-789. To the existing track processor, which finds tracks in the wire chambers downstream of the main analyzing magnet, was added a vertex processor, which finds tracks in the silicon detectors, providing the capability to trigger on decay vertices. In addition, some modification of the track processor was necessitated by the replacement of the E-605/772 MWPC's with drift chambers. The track processor was used successfully in the 1990 data-taking. The vertex processor has now been fully assembled and is undergoing final system tests in preparation for use in the 1991 run. Monte Carlo simulations of the trigger processor's algorithms yield estimates of its background rejection in the range 5 to 20, depending on interaction rate.

The data-acquisition system upgrade has two parts: replacing our existing 4-megabyte fast buffer memory with a 64-megabyte buffer and replacing the 9-track tape output medium with 8mm videotape. The new system, housed in VME, incorporates several 68020 microprocessors, two high-speed and two bulk memory modules, and four Exabyte 8mm tape drives with Rimfire controller. Software for the 68020's is under development and is partially based on code obtained from the Computing Division. We expect to have this system available for use before beam becomes available.

E-789 has been the subject of several talks and papers[1-9]. One M.S. thesis on E-789 (by NIU Student C. Lee) has been completed.[10]

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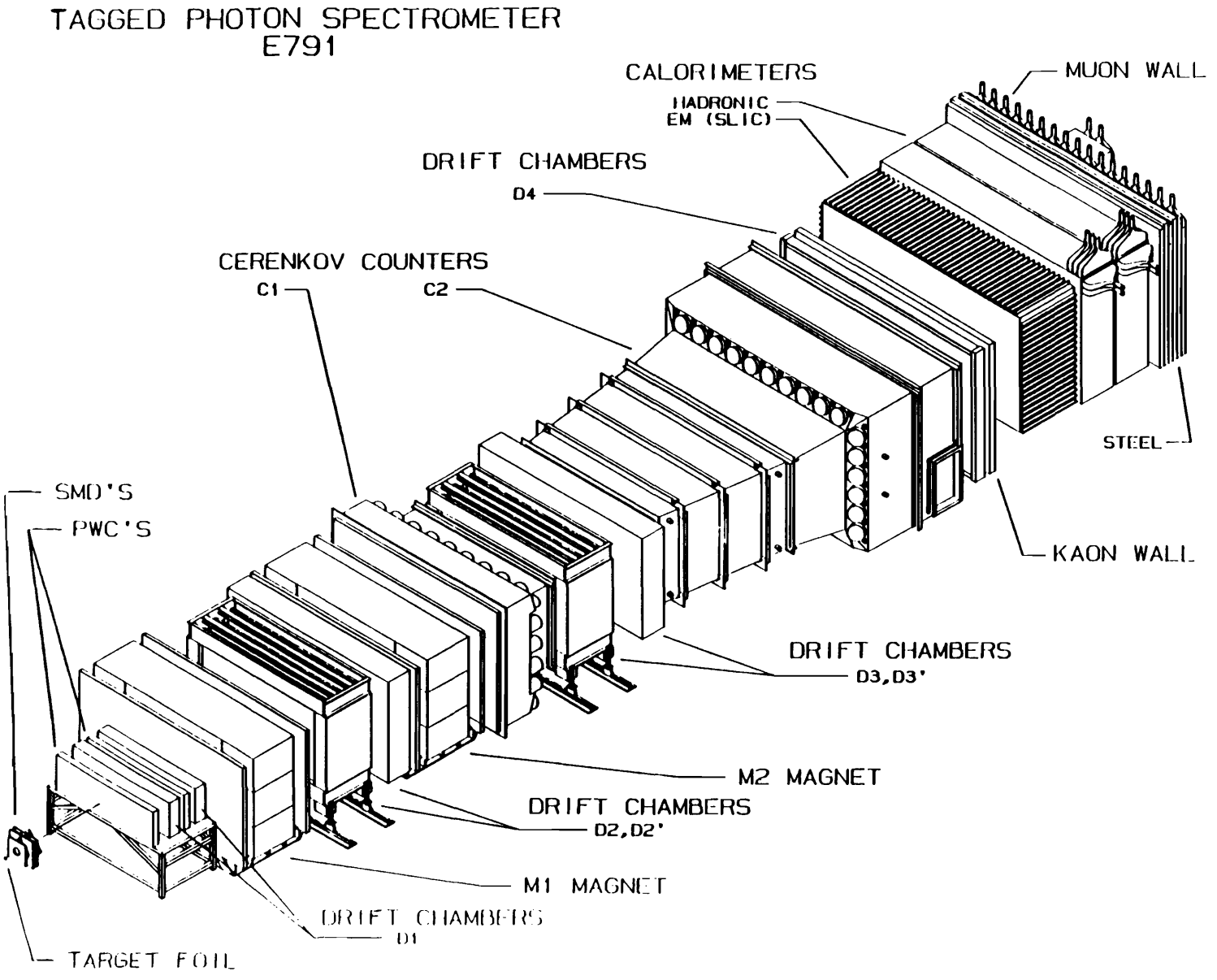
10. C. Lee, "A Parallel Pipelined Dataflow Trigger Processor," M.S. thesis, Northern Illinois University Electrical Engineering Department, December 1990.


TAGGED PHOTON SPECTROMETER
E791
CALORIMETERS
HADRONIC
EM (SLIC)
MUON WALL
DRIFT CHAMBERS
D4
CERENKOV COUNTERS
C1
C2
STEEL
SMD'S
PWC'S
KAON WALL
DRIFT CHAMBERS
D3,D3'
M2 MAGNET
DRIFT CHAMBERS
D2,D2'
M1 MAGNET
DRIFT CHAMBERS
D1
TARGET FOIL

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

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

Status: *Data Analysis*

E-791 aims to break 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 23 planes of high-resolution silicon strip devices followed by 37 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 15 billion events. Extrapolating from the analysis experience of E-691 and E-769 using the same detector we know that about 100,000 charm events will be fully reconstructed (10 x E-691's sample of 10,000 fully reconstructed charm events). It should be possible to reconstruct a couple of hundreds of beauty events 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 $D_s^+ \rightarrow \tau^+\nu_\tau$ and $D^+ \rightarrow \mu^+\nu_\mu$.

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-ten 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 is 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.

E-792 (Aleklett / Sihver) Fragmentation Products from the Reaction 800 GeV p + ^{197}Au

Oregon State, Uppsala (Sweden)

Status: *Data Analysis*

This experiment will help to try and understand the reaction mechanisms in relativistic pA and AA collisions, and will give data to compare to our previous 1.45 A GeV ^{16}O + ^{197}Au and 60 and 200 A GeV ^{16}O + ^{238}U experiments.

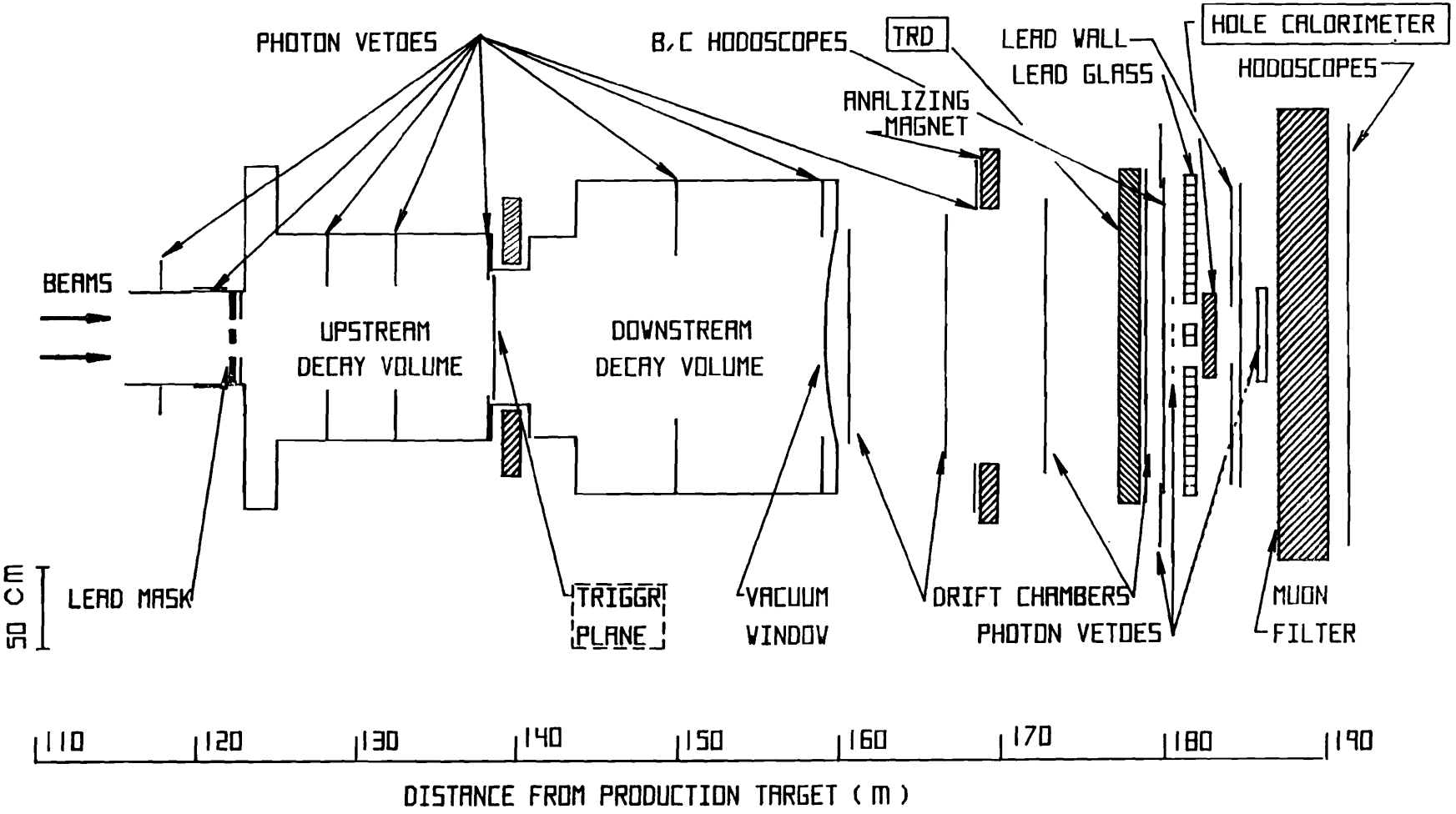
Data taking was completed in 1988.

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.



Schematic of the detector in the Meson Center beamline. Items labelled with boxes are new equipment. The 'Trigger Plane' will be removed.

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

UCLA, Chicago, Elmhurst, Fermilab, Illinois, Rutgers

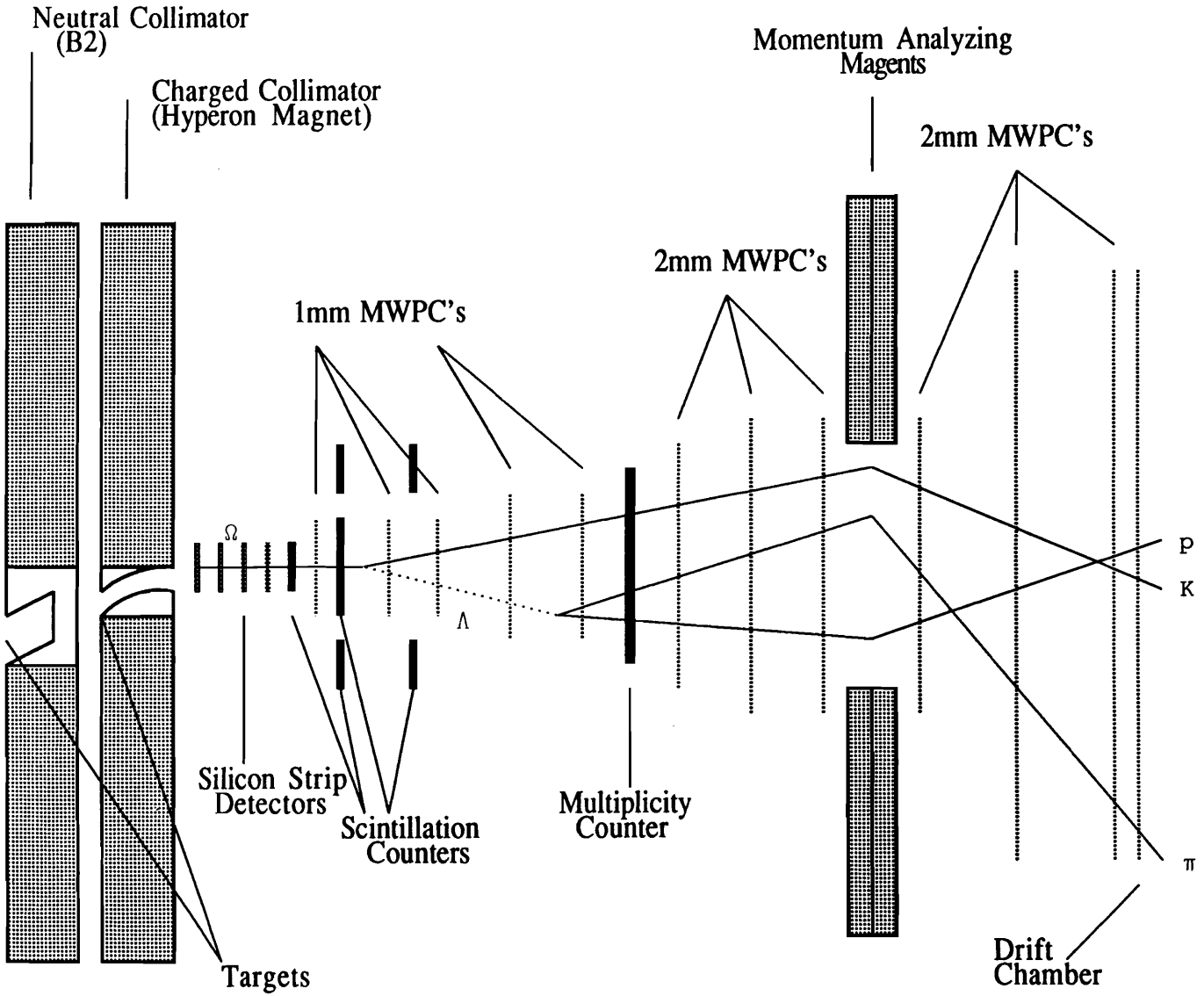
Status: *Data-Taking*

The goal of this experiment is to search for the rare decay $K_L \rightarrow \pi^0 e^+ e^-$ with a sensitivity of $\sim 1 \times 10^{-11}$. This decay is interesting because the standard model predicts that in this decay the direct CP violating component is as large as the indirect CP violating component ($\varepsilon'/\varepsilon \sim 1$). Theoretical predictions of the branching ratio range from 0.4×10^{-12} to 0.6×10^{-9}, whereas the current experimental limits on the branching ratio are: $< 7.5 \times 10^{-9}$ (E-731) and $< 5.5 \times 10^{-9}$ (BNL E-845).

The experiment will utilize the existing E-731/E-773 beamline (MC) and apparatus. New detector systems for E-799 are a transition radiation detector (TRD) for better π/e rejection to reduce background, a high-rate, high-resolution, radiation-hard, electromagnetic calorimeter to replace the existing lead glass array, and a more hermetic photon veto system.

The experiment will be executed in two phases; a two month run in 1991 (Phase I) and a six month run in the following fixed target period (Phase II). Phases I and II will have a single event sensitivity of $\sim 2 \times 10^{-10}$ and $\sim 1 \times 10^{-11}$, respectively.

Besides $K_L \rightarrow \pi^0 e^+ e^-$, the experiment has a sensitivity to other rare decays. In Phase II, we expect to record $\sim 4 \times 10^3$ $K_L \rightarrow \pi^0 \gamma\gamma$, ~ 1000 $\pi^0 \rightarrow e^+ e^-$, and $\sim 4 \times 10^4$ $K_L \rightarrow e^+ e^- \gamma$ events. Measuring the currently unknown $K_L \rightarrow \pi^0 \gamma\gamma$ decay rate will help to determine the CP conserving component of the $K_L \rightarrow \pi^0 e^+ e^-$ amplitude.



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*

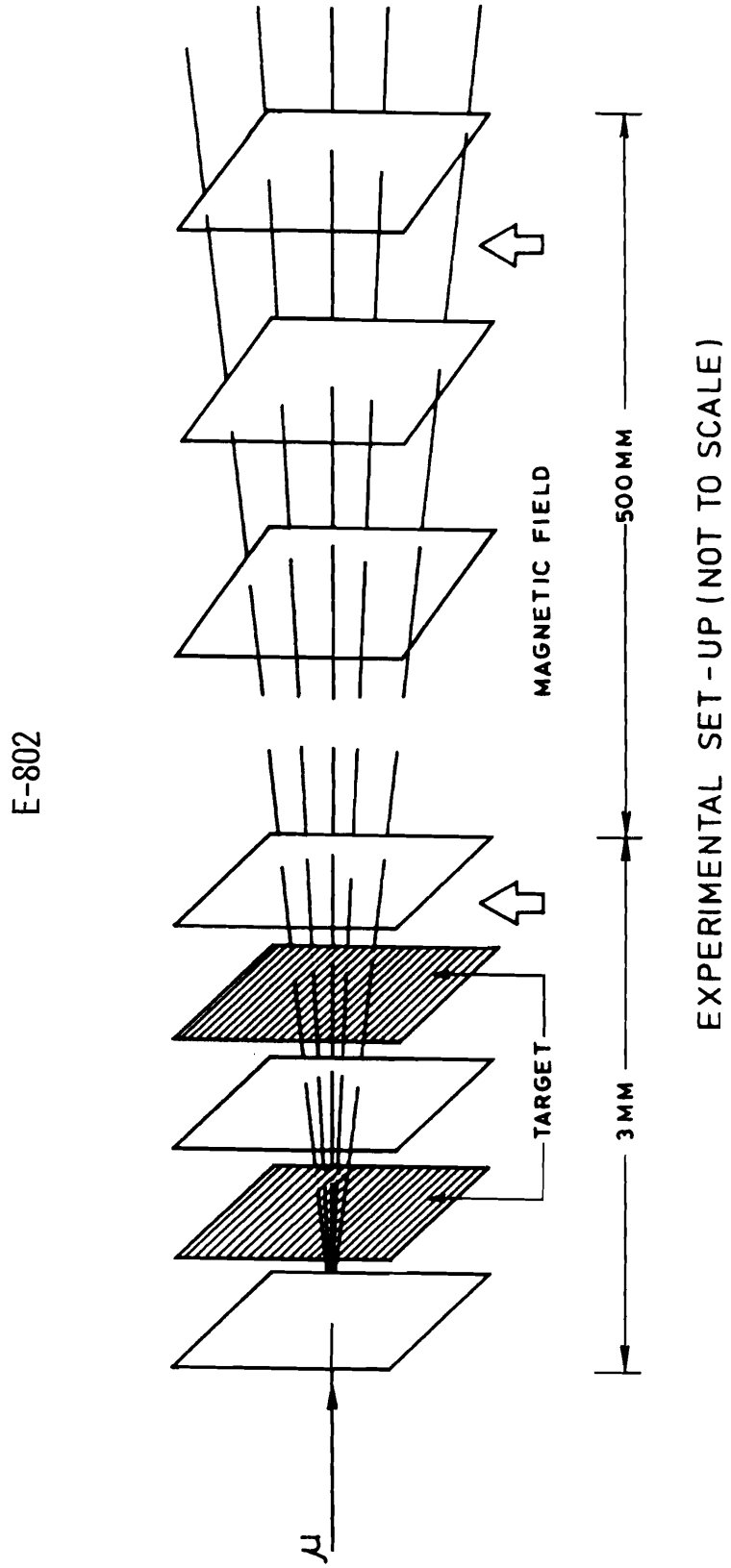
The goal of E-800 is to measure the magnetic moment of the Ω^- to 0.04 nuclear magnetons or better. This experiment uses a new technique called neutral production to produce the initial sample of polarized Ω's. A precise measurement of the Ω magnetic moment will provide valuable input to models of how quarks combine into hadrons.

Baryon magnetic moments play a fundamental role in improving our understanding of the behavior of quarks in hadrons. The simplest quark models correctly give the baryon magnetic moments to within 10% of the experimental data which are measured to better than 2%. The Ω is the simplest accessible three quark system. In the naive quark model, the Ω magnetic moment is just three times the Λ magnetic moment which is assumed equal to the strange quark magnetic moment. More sophisticated quark models which include such effects as configuration mixing and pion contributions cannot accommodate the precise hyperon moment measurements without the introduction of numerous parameters.

We expect the Ω magnetic moment to be an excellent system in which to distinguish these more refined models. The simple structure of the Ω of three identical, spin aligned, relatively heavy quarks should make the Ω more amenable to calculation than the other hyperons. Furthermore, we expect the Ω to give the most unambiguous measurement of the magnetic moment of the strange quark.

The magnetic moment of the Ω is determined by measuring the spin precession of a polarized sample of Ω's. Data from E-756 showed that Ω's produced by protons have little, if any, polarization. E-756 also showed polarized Ω's could be produced by using a secondary neutral beam of polarized Λ's and Ξ's to produce a tertiary beam of polarized Ω's. These Ω polarization measurements are quite important themselves as they provide new information on the mechanism of hyperon polarization which remains without satisfactory explanation. The Ω polarization is found by measuring the polarization of the daughter Λ's which is determined by the angular distribution of the proton in the Λ rest frame.

The spectrometer is located in the P-Center beamline and is shown in the figure. It consists of a set of silicon strip detectors and 1 mm multiwire proportional chambers which help reconstruct the Ω decay, and a set of 1mm and 2mm multiwire proportional chambers on either side of a spectrometer magnet to determine the charge and momentum of the decay products.


E-802
MAGNETIC FIELD
TARGET
500MM
3MM
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.

E-843 (Kim) Interaction of 600 GeV Muons with Emulsion Nuclei

Chonnam (Korea), Korea (Korea)

Status: *Data Analysis*

High energy muon interactions in nuclear emulsion will be used to study diffraction excitation (coherent multiple production events). The coulomb field of the muon will induce this process in one of the emulsion nuclei C, N, O, Ag and Br. It is hoped that this might lead to some understanding of the EMC effect.

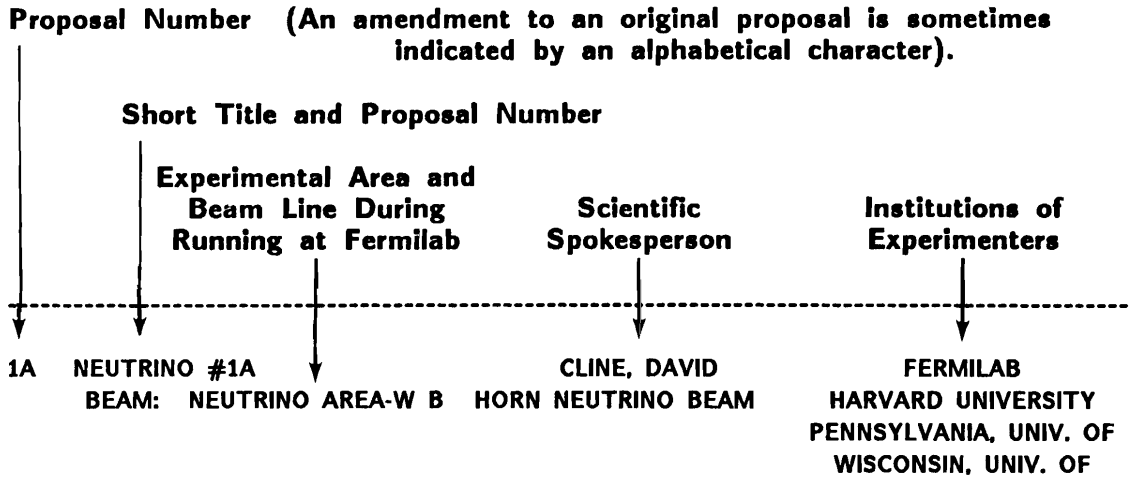
SECTION VIII. MASTER LIST OF PROPOSALS

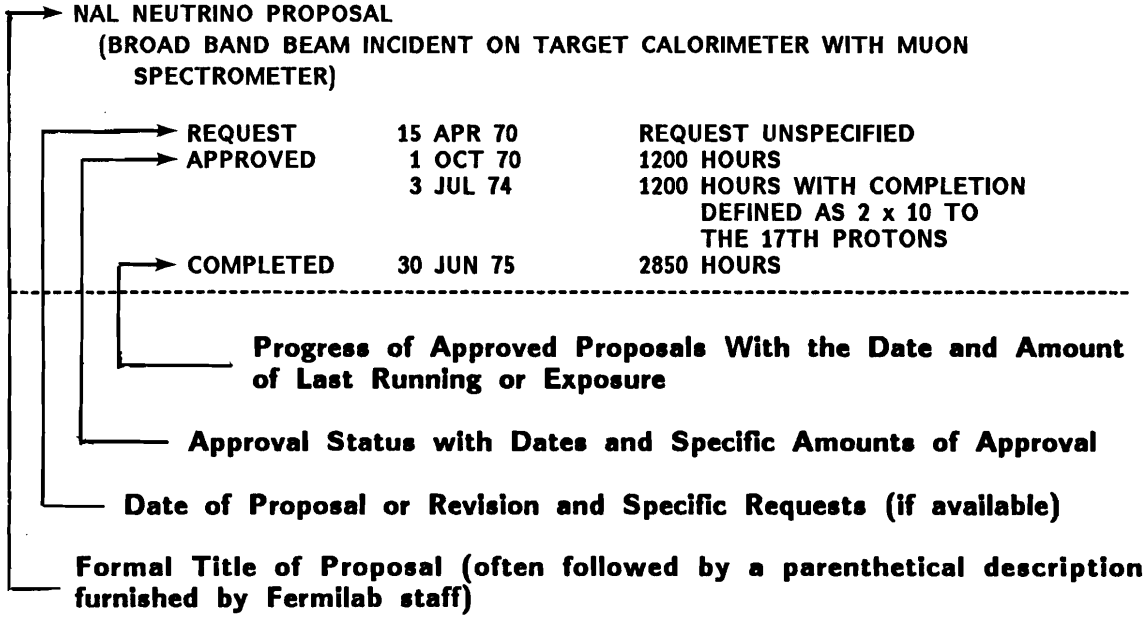
The Master List of proposals contains an entry for each proposal submitted to Fermilab; a typical entry is explained on the next page. In addition to the formal title of the proposal and a brief parenthetical explanation, the name of the spokesperson and a list of participating institutions are included. 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 January 23, 1992

Note: For proposals having a number below 700 only the approved and pending ones are listed.
Total number of proposals - 860 ... Total number of approved & pending proposals - 443

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-P INTERACTIONS FROM 100 GEV/C TO 400 GEV/C WITH A 30-INCH BUBBLE CHAMBER-OPTICAL SPARK 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 100K pix of p - p @ 300 GeV) 120K pix of pi minus - p @ 200 GeV 50K pix of pi minus - p @ 100 GeV) 80K pix of pi plus - p @ 100 GeV	ANL/Fermilab, MSU, ISU, MD Duke, Toronto, Notre Dame 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 January 23, 1992

(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 INSTITUTE (USSR)
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 (USSR)
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	

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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 INSTITUTE (USSR)
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 (USSR)
IHEP, SERPUKHOV (USSR)

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 INSTITUTE (USSR)

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 (USSR)
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 (USSR)
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

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

BEAM: Neutrino Area - Miscellaneous
STUDY OF SECONDARY PARTICLES PRODUCED BY 300 GEV PROTONS IN EMULSION CHAMBERS.

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

AICHI UNIV. OF EDUCATION (JAPAN)
KONAN UNIVERSITY (JAPAN)
NAGOYA UNIVERSITY (JAPAN)
YOKOHAMA NATIONAL UNIV. (JAPAN)

BEAM: Neutrino Area - Miscellaneous
STUDY OF SECONDARY PARTICLES PRODUCED BY 400 GEV PROTONS IN EMULSION CHAMBERS.

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

SUNY AT BUFFALO

BEAM: Neutrino Area - Miscellaneous
INTERACTION OF 300 GEV PROTONS IN NUCLEAR EMULSION.

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

SUNY AT BUFFALO

BEAM: Neutrino Area - Miscellaneous
INTERACTION OF 400 GEV PROTONS IN NUCLEAR EMULSION.

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

UNIV. COLLEGE DUBLIN (IRELAND)
FERMILAB
UNIVERSITY OF LIBRE (BELGIUM)
LONDON UNIVERSITY COLLEGE(ENGLAND)
INFN, ROME (ITALY)
UNIVERSITY OF STRASBOURG (FRANCE)

BEAM: Neutrino Area - Wide Band Horn
A PROPOSED EXPERIMENT TO SEARCH FOR HEAVY LEPTONS.
(Using a hybrid emulsion-spark chamber arrangement.)

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

UNIVERSITY OF MICHIGAN

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.)

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

INP, KRAKOW (POLAND)

BEAM: Neutrino Area - Miscellaneous
CRACOW EMULSION EXPOSURE TO 400 GEV PROTONS.

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

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

BEAM: Neutrino Area - Miscellaneous
PHENOMENOLOGICAL STUDY OF PROTON-NUCLEUS COLLISION AT NAL ENERGIES IN EMULSION (300 GEV).

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

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

BEAM: Neutrino Area - Miscellaneous
PHENOMENOLOGICAL STUDY OF PROTON-NUCLEUS COLLISION AT NAL ENERGIES IN EMULSION (400 GEV).

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

UNIVERSITY OF MICHIGAN
UNIVERSITY OF ROCHESTER

BEAM: Neutrino Area - 30 in. Hadron Beam
STUDY OF MULTIPARTICLE PRODUCTION IN A 30-INCH BUBBLE CHAMBER.
(Formerly known as experiment #138I.)

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

IHEP, BEIJING (PRC)
UNIVERSITY OF MARYLAND
NATIONAL SCIENCE FOUNDATION
UNIVERSITY OF OXFORD (ENGLAND)
VIRGINIA POLYTECHNIC INSTITUTE

BEAM: Neutrino Area - Wide Band Horn
NEUTRINO-ELECTRON SCATTERING AT NAL.

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 (USSR)
MOSCOW STATE UNIVERSITY (USSR)

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 (USSR)

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 (USSR)
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 INSTITUTE (USSR)
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 INSTITUTE (USSR)
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 @ III 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 (USSR)
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 momenta 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,&458
	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 (USSR)

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 (USSR)
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

BEAM: Neutrino Area - Miscellaneous
THE INTERACTIONS OF PROTONS IN NUCLEAR EMULSION AT 400 GEV/C (OR 500 GEV/C).

KAZAKH STATE UNIV., ALMA-ATA(USSR)
LEBEDEV PHYSICAL INSTITUTE (USSR)
ITEP, MOSCOW (USSR)
NPI, ST. PETERSBURG (USSR)
TASHKENT, PHYS.-TECH. INST. (USSR)

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

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.

ARGONNE NATIONAL LABORATORY
UNIVERSITY OF CHICAGO
UNIV. OF ILLINOIS, CHICAGO CIRCLE
PURDUE UNIVERSITY

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

BEAM: Neutrino Area - Miscellaneous
PROPOSAL FOR PARASITIC DUAL TARGET IRRADIATION WITH MUON SPILL BEAM BEHIND EXP #319.

ARGONNE NATIONAL LABORATORY

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

BEAM: Meson Area - M2 Beam
SEARCH FOR PENETRATING MASSIVE NEUTRAL PARTICLES PRODUCED IN HIGH ENERGY PROTON COLLISIONS.

UNIVERSITY OF MARYLAND

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

BEAM: Meson Area - M6 Beam
SEARCH FOR HEAVY LONG-LIVED PARTICLES.
(Using the single arm spectrometer facility.)

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

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

BEAM: Meson Area - M2 Beam
SEARCH FOR HEAVY PARTICLES PRODUCED IN ASSOCIATION WITH PROMPT MUONS.
(Experiment would use modified exp #357 spectrometer.)

FERMILAB
UNIVERSITY OF MICHIGAN
PURDUE UNIVERSITY

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

BEAM: Neutrino Area - Miscellaneous
INVESTIGATION OF MULTIPLE PRODUCTION BY PI - MESONS WITH EMULSION CHAMBER.

OSAKA CITY UNIVERSITY (JAPAN)
SHINSHU UNIVERSITY (JAPAN)

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

BEAM: Neutrino Area - Quadrupole Triplet
STUDY OF DI-MUON EVENTS PRODUCED IN NEUTRINO INTERACTIONS.

CALIFORNIA INSTITUTE OF TECHNOLOGY
FERMILAB
NORTHWESTERN UNIVERSITY
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY

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

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.)

UNIVERSITY OF CHICAGO
LHE, ETH HONGGERBERG (SWITZERLAND)
UNIVERSITY OF WISCONSIN-MADISON

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

BEAM: Meson Area - M1 Beam
SEARCH FOR SHORT LIVED PARTICLES USING A HIGH RESOLUTION STREAMER CHAMBER.

FERMILAB
LAWRENCE BERKELEY LABORATORY
YALE UNIVERSITY

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

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.)

COLUMBIA UNIVERSITY
FERMILAB
SUNY AT STONY BROOK

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 (USSR)
KHARKOV PHYS-TECH INST (USSR)
LEHIGH UNIVERSITY
ITEP, MOSCOW (USSR)
SUNY AT ALBANY
TOMSK POLYTECHNIC INSTITUTE (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	Emulsion Exposure
Completed	8 Oct, 76	1 Stack(s)

510 EMULSION/ELECTRONS @ III 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 — **F. 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 p1- @ 200 or 300 GeV, 700 hours of p1+ @ 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
RUTGERS UNIVERSITY
IHEP, SERPUKHOV (USSR)

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 (USSR)
UNIVERSITY OF KANSAS
INP, KRAKOW (POLAND)
ITEP, MOSCOW (USSR)
IHEP, SERPUKHOV (USSR)
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)
RICE UNIVERSITY
IHEP, SERPUKHOV (USSR)
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 (USSR)
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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597 30-INCH HYBRID #597 — **J. James Whitmore**

UNIVERSITY OF CAMBRIDGE (ENGLAND)
DUKE UNIVERSITY
FERMILAB
UNIVERSITY OF KANSAS
MICHIGAN STATE UNIVERSITY
NOTRE DAME UNIVERSITY

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.)

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**

CEN-SACLAY (FRANCE)
CERN (SWITZERLAND)
COLUMBIA UNIVERSITY
FERMILAB
KEK (JAPAN)
KYOTO UNIVERSITY (JAPAN)
SUNY AT STONY BROOK
UNIVERSITY OF WASHINGTON

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.)

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**

COLUMBIA UNIVERSITY
FERMILAB
SUNY AT STONY BROOK

BEAM: Proton Area - Center
A SEARCH FOR THE ETA SUB C IN HADRONIC INTERACTIONS.
(Using the spectrometer from exp #288/494.)

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 Selove**

ARGONNE NATIONAL LABORATORY
FERMILAB
LEHIGH UNIVERSITY
UNIVERSITY OF PENNSYLVANIA
RICE UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M6 Beam
A STUDY OF THE STRUCTURE OF HIGH P TRANSVERSE HADRONIC INTERACTIONS.
(This proposal supersedes P-246.)

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**

FERMILAB
HOWARD UNIVERSITY
UNIVERSITY OF ILLINOIS, CHAMPAIGN
UNIVERSITY OF PENNSYLVANIA
PURDUE UNIVERSITY
TUFTS UNIVERSITY

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.)

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**

ROCKEFELLER UNIVERSITY

BEAM: Proton Area - East
A PROPOSAL TO MEASURE THE DIFFRACTIVE PHOTON DISSOCIATION ON HYDROGEN.

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**

UNIVERSITY OF FIRENZE (ITALY)
UNIVERSITY OF MICHIGAN
OHIO STATE UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Meson Area - M2 Beam
PROPOSAL FOR A PROMPT NEUTRINO EXPERIMENT AT FERMILAB.

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**

UNIVERSITY OF CHICAGO
FERMILAB
IOWA STATE UNIVERSITY
PRINCETON UNIVERSITY

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.)

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 300 pulses per hour are assumed.
Approval	1 Jul, 79	1,000 Hours
Completed	14 Jul, 84	2,260 Hours

616 NEUTRINO #616 — **Frank Sciulli**

CALIFORNIA INSTITUTE OF TECHNOLOGY
COLUMBIA UNIVERSITY
FERMILAB
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY

BEAM: Neutrino Area - Dichromatic
PROPOSAL TO MEASURE NEUTRINO STRUCTURE FUNCTIONS.
(Use of the Lab E neutrino detector to continue work begun in exp #356.)

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 (USSR)
ITEP, MOSCOW (USSR)
UNIVERSITY OF OXFORD (ENGLAND)
PANJAB UNIVERSITY (INDIA)
RUTGERS UNIVERSITY
IHEP, SERPUKHOV (USSR)
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 (USSR)
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 - M4 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 INSTITUTE (USSR)
LOUISIANA STATE UNIVERSITY
TASHKENT, PHYS.-TECH. INST. (USSR)

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, SERPUKHOV (USSR)

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

682 POLARIZED BEAM #682 — **David G. Underwood**

BEAM: Meson Area - Polarized Proton Beam
STUDY OF THE PT DEPENDENCE OF PI-PLUS/MINUS INCLUSIVE PRODUCTION WITH A POLARIZED PROTON BEAM AND TARGET.

ARGONNE NATIONAL LABORATORY
KYOTO UNIVERSITY (JAPAN)
LAPP, D'ANNECY-LE-VIEUX (FRANCE)
LAWRENCE BERKELEY LABORATORY
RICE UNIVERSITY
UNIVERSITY DI TRIESTE (ITALY)

Request	1 Feb, 81	1,700 Hours
Unconsidered	26 Jun, 81	

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

688 POLARIZED BEAM #688 — W. Rodney Ditzler

BEAM: Meson Area - Polarized Proton Beam
NUCLEAR-SIZE DEPENDENCE OF SINGLE-SPIN ASYMMETRIES IN HIGH-PT HADRON PRODUCTION.

ARGONNE NATIONAL LABORATORY
KYOTO UNIVERSITY (JAPAN)
RICE UNIVERSITY

Request	1 Feb, 81	400 Hours
Unconsidered	26 Jun, 81	

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

699 POLARIZED BEAM #699 — Robert W. Stanek

BEAM: Meson Area - Polarized Proton Beam
STUDY OF SPIN-DEPENDENT ASYMMETRIES USING CALORIMETER TRIGGERED HIGH PT EVENTS WITH POLARIZED BEAM AND POLARIZED TARGET.

ARGONNE NATIONAL LABORATORY
CEN-SACLAY (FRANCE)
KYOTO UNIVERSITY (JAPAN)
LAPP, D'ANNECY-LE-VIEUX (FRANCE)
LAWRENCE BERKELEY LABORATORY
LEHIGH UNIVERSITY
UNIVERSITY OF PENNSYLVANIA
RICE UNIVERSITY
UNIVERSITY DI TRIESTE (ITALY)
UNIVERSITY OF WISCONSIN-MADISON

Request	1 Feb, 81	1,000 Hours
Unconsidered	27 Jun, 81	

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	

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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		

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)
RICE UNIVERSITY
IHEP, SERPUKHOV (USSR)
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 (USSR)
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		

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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

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 (USSR)
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

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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	

723 GRAVITATIONAL DETECTOR #723 — Adrian Melissinos

BEAM: Collision Area (C-0)
TEST OF A GRAVITATIONAL DETECTOR AT THE TEVATRON COLLIDER.

FERMILAB
UNIVERSITY OF ROCHESTER

Request	21 Oct, 82	Unspecified
Approval	12 Mar, 84	Test Running
Completed	29 Aug, 85	Test Running

724 CALORIMETRIC DETECTOR #724 — Michael J. Longo

BEAM: Collision Area (D-0)
COMPLETE CALORIMETRIC DETECTOR FOR THE D-0 AREA.

CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIV. OF ILLINOIS, CHICAGO CIRCLE
MCGILL UNIVERSITY (CANADA)
UNIVERSITY OF MICHIGAN
NOTRE DAME UNIVERSITY

Request	26 Oct, 82	Unspecified
Rejected	1 Jul, 83	

725 DIFFRACTION DISSOCIATION #725 — Konstantin Goulianos

BEAM: Collision Area (D-0)
A PROPOSAL TO MEASURE SINGLE AND DOUBLE DIFFRACTION DISSOCIATION AT THE FERMILAB PBAR-P COLLIDER.

ROCKEFELLER UNIVERSITY

Request	1 Nov, 82	Unspecified
Rejected	1 Jul, 83	

726 CALORIMETRIC DETECTOR #726 — Maris A. Abolins

BEAM: Collision Area (D-0)
PROPOSED CALORIMETRIC DETECTOR FOR THE D-0 AREA.

UNIVERSITY OF ARIZONA
FERMILAB
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF PENNSYLVANIA

Request	1 Nov, 82	Unspecified
Rejected	1 Jul, 83	

727 FORWARD CALORIMETER #727 — Jerome L. Rosen

BEAM: Collision Area (D-0)
SPLIT-FIELD MAGNET SPECTROMETER AND ELECTROMAGNETIC SHOWER DETECTOR FOR D-0.

NORTHWESTERN UNIVERSITY

Request	2 Nov, 82	Unspecified
Withdrawn	16 May, 83	

728 MUON PRODUCTION #728 — Daniel R. Green

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.)

UNIVERSITY OF ARIZONA
FERMILAB
FLORIDA STATE UNIVERSITY
UNIVERSITY OF MARYLAND
VIRGINIA POLYTECHNIC INSTITUTE

Request	1 Nov, 82	Unspecified
Rejected	1 Jul, 83	

729 EMULSION/PROTONS @ 1 TEV #729 — Atul Gurtu

BEAM: Meson Area - Test Beam
PROPOSAL TO STUDY CHARM AND MULTIPARTICLE PRODUCTION IN 1 TEV PROTON-EMULSION COLLISIONS

TATA INSTITUTE (INDIA)

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

BEAM: Proton Area - Center
EMULSION EXPOSURE TO 250 GEV SIGMA-MINUS.

INP, KRAKOW (POLAND)
INST.FOR NUCL. RESEARCH (BULGARIA)
UNIVERSITY OF WASHINGTON

Request	5 Jan, 83	Unspecified
Approval	10 Feb, 84	Unspecified
Completed	10 Feb, 84	4 Hours

731 CP VIOLATION #731 — Bruce D. Winstein

BEAM: Meson Area - Center
A MEASUREMENT OF THE MAGNITUDE OF (E'/E) IN THE NEUTRAL KAON SYSTEM TO A PRECISION OF .001.

CEN-SACLAY (FRANCE)
UNIVERSITY OF CHICAGO
ELMHURST COLLEGE
FERMILAB
PRINCETON UNIVERSITY

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

BEAM: Proton Area - Center
A SEARCH FOR THE DECAY NEUTRAL CASCADE TO PROTON AND NEGATIVE PION.

UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
RUTGERS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON

Request	1 Feb, 83	Unspecified
Rejected	25 Jun, 85	

733 NEUTRINO INTERACTIONS #733 — Raymond L. Brock

BEAM: Neutrino Area - Center
PROPOSAL TO STUDY HIGH ENERGY NEUTRINO INTERACTIONS WITH THE TEVATRON QUADRUPOLE TRIPLET BEAM.

FERMILAB
UNIVERSITY OF FLORIDA
MASSACHUSETTS INST. OF TECHNOLOGY
MICHIGAN STATE UNIVERSITY

Request	1 Feb, 83	Unspecified
	16 Sep, 83	Unspecified
Approval	12 Nov, 83	Unspecified Stage I approval.
Completed	1 Feb, 88	4,100 Hours

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734	**HYPERON PRODUCTION #734** BEAM: Proton Area - Center PRIMAKOFF PRODUCTION OF HYPERON EXCITED STATES.	**Michael V. Hynes**	UNIV. OF CALIFORNIA, LOS ANGELES LOS ALAMOS NATIONAL LABORATORY
	Request 1 Apr, 83 Unspecified Inactive 21 May, 86		
735	**PARTICLE SEARCH #735** 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.	**Laszlo J. Gutay**	DUKE UNIVERSITY FERMILAB IOWA STATE UNIVERSITY NOTRE DAME UNIVERSITY PURDUE UNIVERSITY UNIVERSITY OF WISCONSIN-MADISON
	Request 11 Apr, 83 Unspecified 16 Sep, 83 Unspecified Approval 15 Dec, 83 Unspecified Stage I approval. Completed 31 May, 89 Unspecified		
736	**D-0 QUARK SEARCH #736** BEAM: Collision Area (D-0) A PROPOSAL TO CONDUCT A QUARK SEARCH AT THE FERMILAB COLLIDER.	**Robert K. Adair**	BROOKHAVEN NATIONAL LABORATORY YALE UNIVERSITY
	Request 11 Apr, 83 Unspecified Rejected 1 Jul, 83		
737	**BATISS EXPERIMENT #737** BEAM: Unspecified Beam STUDY OF HIGH ENERGY NEUTRINOS WITH A DEEP UNDERWATER DETECTOR OF A MASS GREATER THAN 10 TO THE 6TH TONS.	**Peter Kotzer**	KAZAKH STATE UNIV., ALMA-ATA(USSR) MOSCOW STATE UNIVERSITY (USSR) UNIVERSITY OF WASHINGTON WESTERN WASHINGTON UNIVERSITY
	Request 25 Apr, 83 Unspecified Rejected 12 Nov, 83		
738	**NARROW BAND #738** BEAM: Neutrino Area - Center LETTER OF INTENT TO RUN IN THE NARROW BAND AND BEAM AT TEVATRON II.	**Charles Baltay**	COLUMBIA UNIVERSITY
	Request 3 Jun, 83 Unspecified Withdrawn 26 Apr, 84		
739	**ELECTRON-POSITRON #739** BEAM: Proton Area - East MEASUREMENTS OF CRYSTAL-ASSISTED ELECTRON-POSITRON PAIR CREATION.	**Nelson Cue and Chih-Ree Sun**	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** BEAM: Collision Area (D-0) STUDY OF PROTON ANTI-PROTON COLLISIONS USING A LARGE DETECTOR AT D-0.	**Paul D. Grannis**	UNIVERSITY OF ARIZONA BROOKHAVEN NATIONAL LABORATORY BROWN UNIVERSITY UNIV. OF CALIFORNIA, RIVERSIDE CBPF (BRAZIL) CEN-SACLAY (FRANCE) COLUMBIA UNIVERSITY FERMILAB FLORIDA STATE UNIVERSITY UNIVERSITY OF HAWAII AT MANOA UNIV. OF ILLINOIS, CHICAGO CIRCLE INDIANA UNIVERSITY IOWA STATE UNIVERSITY LAWRENCE BERKELEY LABORATORY UNIVERSIDAD DE LOS ANDES(COLOMBIA) UNIVERSITY OF MARYLAND MICHIGAN STATE UNIVERSITY UNIVERSITY OF MICHIGAN SUNY AT STONY BROOK NEW YORK UNIVERSITY NORTHERN ILLINOIS UNIVERSITY NORTHWESTERN UNIVERSITY NOTRE DAME UNIVERSITY PANJAB UNIVERSITY (INDIA) PURDUE UNIVERSITY RICE UNIVERSITY UNIVERSITY OF ROCHESTER IHEP, SERPUKHOV (USSR) TATA INSTITUTE (INDIA) TEXAS A&M UNIVERSITY UNIVERSITY OF TEXAS AT ARLINGTON
	Request 9 Sep, 83 Unspecified Approval 10 Feb, 84 Unspecified Being Installed 31 Oct, 90		
741	**COLLIDER DETECTOR #741** BEAM: Collision Area (B-0) STUDY OF PROTON ANTI-PROTON COLLISIONS USING A LARGE DETECTOR AT B-0.	**Melvyn Jay Shochet and Alvin V. Tollestrup**	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		

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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 (USSR)
YALE UNIVERSITY

Request	13 Jun, 83	Unspecified
Inactive	15 Jun, 85	

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-EMPS.

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)

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752 PARTICLE COLLISIONS #752 — James W. Cronin

UNIVERSITY OF CHICAGO
TECHNION-ISRAEL INST (ISRAEL)

BEAM: Unspecified Beam
PROPOSAL TO SEARCH FOR ANOMALOUSLY LARGE HADRON CROSS SECTIONS AT SHORT DISTANCES.

Request	23 Oct. 84	200 Hours
Withdrawn	8 Dec. 86	

753 CHANNELING STUDIES #753 — James S. Forster

BELL NORTHERN RESEARCH LAB(CANADA)
CHALK RIVER NUCLEAR LAB. (CANADA)
FERMILAB
UNIVERSITY OF NEW MEXICO
SUNY AT ALBANY

BEAM: Meson Area - Bottom
PROPOSAL TO IMPROVE THE DEFLECTION OF HIGH ENERGY PARTICLE BEAMS BY CHANNELING IN BENT CRYSTALS OF SI AND GE.

Request	28 Sep. 84	400 Hours
Approval	20 Nov. 84	Unspecified
Completed	5 Jul. 85	150 Hours

754 CHANNELING TESTS #754 — Chih-Ree Sun

FERMILAB
GENERAL ELECTRIC R&D CENTER
SUNY AT ALBANY
SANDIA LABORATORIES
SSC LABORATORY

BEAM: Meson Area - Bottom
CRYSTAL CHANNELING TESTS IN M-BOTTOM INCLUDING FOCUSING WITH DEFORMED CRYSTALS AND STUDIES OF HIGH Z CRYSTALS.

Request	1 Oct. 84	300 Hours
Approval	20 Nov. 84	Unspecified
Approved/Inactive	24 Dec. 91	

755 BEAUTY & CHARM STUDY #T755 — Richard D. Majka and Anna Jean Slaughter

FERMILAB
YALE UNIVERSITY

BEAM: Meson Area - Test Beam
A HIGH SENSITIVITY STUDY OF BEAUTY AND CHARM IN HADROPRODUCTION AT THE TEVATRON.

Request	2 Oct. 84	Unspecified
Approval	25 Nov. 86	Unspecified
Completed	15 Feb. 88	Unspecified

756 MAGNETIC MOMENT #756 — Kam-Biu Luk

UNIVERSITY OF ARIZONA
UNIV. OF CALIFORNIA, BERKELEY
FERMILAB
INDIANA UNIVERSITY
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF MICHIGAN
UNIVERSITY OF MINNESOTA
RUTGERS UNIVERSITY

BEAM: Proton Area - Center
MEASUREMENT OF THE MAGNETIC MOMENT OF THE OMEGA MINUS HYPERON.

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

FERMILAB
UNIVERSITY OF ILLINOIS, CHAMPAIGN
UNIVERSITY OF WASHINGTON
UNIVERSITY OF WISCONSIN-MADISON

BEAM: Neutrino Area - Muon Beam
LETTER OF INTENT FOR A PROPOSAL TO STUDY MOMENTUM RESOLUTION FOR MUONS ABOVE 300 GEV IN MAGNETIZED IRON.

Request	12 Dec. 84	Test Running
Rejected	14 Dec. 85	

758 EMULSION EXPOSURE #758 — Mitsuko Kazuno and Hiroshi Shibuya

NAGOYA UNIVERSITY (JAPAN)
TOHO UNIVERSITY (JAPAN)

BEAM: Meson Area - Test Beam
STUDY OF THE MECHANISM OF MULTIPARTICLE PRODUCTION IN EMULSION NUCLEI @ 800 GEV PROTONS.

Request	11 Mar. 85	Unspecified
Approval	11 Mar. 85	Unspecified
Completed	26 Apr. 85	2 Emulsion Stack(s)

759 EMULSION EXPOSURE #759 — Yoshihiro Tsuzuki

KOBE UNIVERSITY (JAPAN)
OSAKA CITY UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)

BEAM: Meson Area - Test Beam
A STUDY OF NUCLEAR INTERACTIONS OF 800 GEV PROTONS IN EMULSION.

Request	11 Mar. 85	Unspecified
Approval	11 Mar. 85	Unspecified
Completed	26 Apr. 85	2 Emulsion Stack(s)

760 CHARMONIUM STATES #760 — Rosanna Cester

UNIV. OF CALIFORNIA, IRVINE
FERMILAB
UNIVERSITY OF FERRARA (ITALY)
INFN, GENOVA (ITALY)
NORTHWESTERN UNIVERSITY
PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY OF TORINO (ITALY)

BEAM: Accumulator Ring
A PROPOSAL TO INVESTIGATE THE FORMATION OF CHARMONIUM STATES USING THE PBAR ACCUMULATOR RING.

Request	29 Mar. 85	Unspecified
Approval	25 Jun. 85	Unspecified
Completed	10 Jan. 92	Unspecified

761 HYPERON RADIATIVE DECAY #761 — Alexei A. Vorobyov

IHEP, BEIJING (PRC)
UNIVERSITY OF BRISTOL (ENGLAND)
CBPF (BRAZIL)
FERMILAB
UNIVERSITY OF IOWA
ITEP, MOSCOW (USSR)
UNIV. FEDERAL DO RIO DE JANEIRO
UNIVERSITY OF SAO PAULO (BRAZIL)
NPI, ST. PETERSBURG (USSR)
YALE UNIVERSITY

BEAM: Proton Area - Center
PROPOSAL TO STUDY HYPERON RADIATIVE DECAY.

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

AOYAMA GAKUIN UNIVERSITY (JAPAN)
ICRR, UNIVERSITY OF TOKYO (JAPAN)
KOBE UNIVERSITY (JAPAN)
OKAYAMA UNIVERSITY (JAPAN)
OSAKA SCIENCE EDUC. INST. (JAPAN)

BEAM: Meson Area - Test Beam
CASCADE SHOWERS ORIGINATING IN PROTON-NUCLEUS COLLISIONS.

Request	11 Jun. 85	Unspecified
Approval	21 Jun. 85	Unspecified
Completed	11 Jul. 85	18 Emulsion Stack(s)

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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)

764 EMULSION EXPOSURE #764 — **Hirotada Nanjo**

BEAM: Meson Area - Test Beam
EXCLUSIVE INVESTIGATION OF MULTIPLE PRODUCTION IN RAPIDITY SPACE.

HIROSAKI UNIVERSITY (JAPAN)

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**

BEAM: Meson Area - Test Beam
TRANSVERSE MOMENTUM MEASUREMENT OF SECONDARY PARTICLES IN PROTON-EMULSION COLLISIONS AT 800 GEV.

OKAYAMA UNIVERSITY (JAPAN)

Request	20 Jun, 85	Unspecified
Approval	21 Jun, 85	Unspecified
Completed	11 Jul, 85	7 Emulsion Stack(s)

766 MR TUNNEL NEUTRONS #1766 — **Joseph B. McCaslin**

BEAM: Collision Area (Miscellaneous)
MEASUREMENTS OF THE NEUTRON SPECTRUM IN THE TEVATRON TUNNEL WITH APPLICATION TO THE SSC.

FERMILAB
LAWRENCE BERKELEY LABORATORY

Request	11 Jul, 85	Unspecified
Approval	17 Jul, 85	Unspecified
Completed	13 Oct, 85	Unspecified

767 MUON CALORIMETRY #767 — **Yasushi Muraki**

BEAM: Neutrino Area - Muon Beam
MEASUREMENT OF DIRECT ELECTRON PAIR PRODUCTION CROSS-SECTION IN THE TEVATRON MUON BEAM.

CHUO UNIVERSITY (JAPAN)
ICRR, UNIVERSITY OF TOKYO (JAPAN)
KEK (JAPAN)
NAGOYA UNIVERSITY (JAPAN)

Request	29 Aug, 85	Unspecified
Rejected	1 Jul, 86	

768 POLARIZED SCATTERING #768 — **Alan D. Krisch**

BEAM: Proton Area - West
PROTON - PROTON ELASTIC SCATTERING WITH A POLARIZED TARGET.

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

Request	12 Nov, 85	Unspecified
Rejected	30 Jun, 87	

769 PION & KAON CHARM PROD. #769 — **Jeffrey A. Appel**

BEAM: Proton Area - East
PION AND KAON PRODUCTION OF CHARM AND CHARM-STRANGE STATE.

CBPF (BRAZIL)
FERMILAB
UNIVERSITY OF MISSISSIPPI
NORTHEASTERN UNIVERSITY
UNIVERSITY OF TORONTO (CANADA)
TUFTS UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON
YALE UNIVERSITY

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**

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
UNIVERSITY OF WISCONSIN-MADISON

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**

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.

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 (USSR)
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

Request	10 Dec, 86	Unspecified
Approval	4 Apr, 87	Unspecified
In Progress	8 Jan, 92	Unspecified

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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		
773	**ETA00 & ETA +- PHASE DIFFERENCE #773**	**George D. Gollin**	UNIVERSITY OF CHICAGO ELMHURST COLLEGE FERMILAB UNIVERSITY OF ILLINOIS, CHAMPAIGN RUTGERS UNIVERSITY
	BEAM: Meson Area - Center MEASUREMENT OF PHASE DIFFERENCE BETWEEN ETA 00 AND ETA +- TO A PRECISION OF 1/2 DEGREE.		
	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**	FERMILAB UNIVERSITY OF ILLINOIS, CHAMPAIGN INP, KRAKOW (POLAND) NORTHEASTERN UNIVERSITY
	BEAM: Proton Area - Broad Band ELECTRON BEAM DUMP PARTICLE SEARCH IN THE WIDE BAND HALL.		
	Request 4 Apr, 86 Unspecified Approval 10 Dec, 86 Unspecified Completed 27 Aug, 90 Unspecified		
775	**CDF UPGRADE #775**	**Melvyn Jay Shochet and Alvin V. Tollestrup**	ARGONNE NATIONAL LABORATORY BRANDEIS UNIVERSITY UNIV. OF CALIFORNIA, LOS ANGELES UNIVERSITY OF CHICAGO DUKE UNIVERSITY FERMILAB INFN, FRASCATI (ITALY) HARVARD UNIVERSITY UNIVERSITY OF ILLINOIS, CHAMPAIGN JOHNS HOPKINS UNIVERSITY KEK (JAPAN) LAWRENCE BERKELEY LABORATORY UNIVERSITY OF MICHIGAN 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
	BEAM: Collision Area (B-0) CDF UPGRADE (Level-3 Trigger: Silicon Vertex (#775A); and Muon System (#775B))		
	Request 28 May, 86 Unspecified Approval 1 Jul, 86 Unspecified Phase I approval. Being Installed 31 Oct, 90		
776	**NUCLEAR CAL. CROSS SECTIONS#776**	**Samuel I. Baker**	BROOKHAVEN NATIONAL LABORATORY CERN (SWITZERLAND) FERMILAB
	BEAM: Miscellaneous Area MEASUREMENT OF NUCLEAR CALIBRATION CROSS SECTIONS FOR PROTONS GREATER THAN 400 GEV.		
	Request 6 Aug, 86 Unspecified Approval 7 Jan, 87 Unspecified Completed 15 Feb, 88 Unspecified		
777	**MR TUNNEL NEUTRONS #777**	**Joseph B. McCaslin**	FERMILAB LAWRENCE BERKELEY LABORATORY SSC CENTRAL DESIGN GROUP
	BEAM: Collision Area (Miscellaneous) NEUTRON FLUX MEASUREMENTS IN THE TEVATRON TUNNEL.		
	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**	CERN (SWITZERLAND) CORNELL UNIVERSITY FERMILAB UNIVERSITY OF HOUSTON SSC CENTRAL DESIGN GROUP SLAC
	BEAM: Collision Area (Miscellaneous) STUDY OF THE SSC MAGNET APERTURE CRITERION.		
	Request 18 Oct, 86 Unspecified Approval 10 Dec, 86 Unspecified Completed 21 Jan, 91 Unspecified		
779	**HIGH RATE CALORIMETER STUDY#779**	**David Anderson**	FERMILAB
	BEAM: Meson Area - West PROPOSAL TO BUILD A VERY HIGH RATE CALORIMETER.		
	Request 29 Oct, 86 Unspecified Rejected 10 Dec, 86		
780	**CHARM PRODUCTION BY PROTONS#780**	**Ronald J. Lipton and Douglas Potter**	UNIV. OF CALIFORNIA, DAVIS CARNEGIE-MELLON UNIVERSITY UNIVERSITY OF OKLAHOMA
	BEAM: Neutrino Area - East STUDY OF CHARM PRODUCED BY 850 GEV PROTONS.		
	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 (USSR)
UNIVERSITY OF ROCHESTER
UNIVERSITY OF SAO PAULO (BRAZIL)
NPI, ST. PETERSBURG (USSR)
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	
Unconsidered	4 Mar, 87		

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.

UNIV. OF CALIFORNIA, DAVIS
FERMILAB
UNIVERSITY OF FLORIDA
UNIVERSITY OF HOUSTON
ILLINOIS INSTITUTE OF TECHNOLOGY
UNIVERSITY OF IOWA
UNIVERSIDAD DE LOS ANDES(COLOMBIA)
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.
Unscheduled	30 Jan, 89		

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	
Unconsidered	29 Apr, 89		

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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
In Progress	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., ALMA-ATA(USSR)
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
Unconsidered	5 Mar, 88	

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 INSTITUTE (USSR)

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	
Unconsidered	24 Aug, 89		

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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) RICE UNIVERSITY IHEP, SERPUKHOV (USSR) 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, SERPUKHOV (USSR)
	Request 1 Mar, 90 Unspecified Unconsidered 1 Mar, 90		
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) RICE UNIVERSITY IHEP, SERPUKHOV (USSR) UNIVERSITY DI TRIESTE (ITALY) UNIVERSITY OF UDINE (ITALY)
	Request 7 Mar, 90 Unspecified Unconsidered 7 Mar, 90		
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 Unconsidered 5 Mar, 90		
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 UNIVERSIDAD DE LOS ANDES(COLOMBIA) TEMPLE UNIVERSITY WORLD LAB, LAUSANNE (SWITZERLAND)
	Request 14 Mar, 90 Unspecified Unconsidered 11 Mar, 91		
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 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 MICHIGAN
	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
Unconsidered	28 Feb, 90	

815 NEUTRINO #815 — Michael H. Shaevitz

BEAM: Neutrino Area - Center
Precision Measurements of Neutrino Neutral Current Interactions Using a Sign-Selected Beam

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.
Unconsidered	7 Mar, 90	

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 (USSR)
IHEP, SERPUKHOV (USSR)

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 (USSR)
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

UNIVERSITY OF ARIZONA
BROOKHAVEN NATIONAL LABORATORY
BROWN UNIVERSITY
UNIV. OF CALIFORNIA, RIVERSIDE
CBPF (BRAZIL)
CEN-SACLAY (FRANCE)
COLUMBIA UNIVERSITY
FERMILAB
FLORIDA STATE UNIVERSITY
UNIVERSITY OF HAWAII AT MANOA
UNIV. OF ILLINOIS, CHICAGO CIRCLE
INDIANA UNIVERSITY
IOWA STATE UNIVERSITY
LAWRENCE BERKELEY LABORATORY
UNIVERSIDAD DE LOS ANDES(COLOMBIA)
UNIVERSITY OF MARYLAND
MICHIGAN STATE UNIVERSITY
UNIVERSITY OF MICHIGAN
SUNY AT STONY BROOK
NEW YORK UNIVERSITY
NORTHERN ILLINOIS UNIVERSITY
NORTHWESTERN UNIVERSITY
NOTRE DAME UNIVERSITY
PANJAB UNIVERSITY (INDIA)
PURDUE UNIVERSITY
RICE UNIVERSITY
UNIVERSITY OF ROCHESTER
IHEP, SERPUKHOV (USSR)
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
Unconsidered	4 Oct, 90	

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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, SANTA CRUZ
UNIV. OF CALIFORNIA, SAN DIEGO
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 (USSR)
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 (USSR)
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,MINSK(USSR)
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, PHYS.-TECH. INST. (USSR)
IHEP, TBILISI STATE UNIV. (USSR)
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 INSTITUTE (USSR)

Request	1 Oct, 90	Unspecified
Unconsidered	1 Oct, 90	

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
Unconsidered	8 Oct, 90	

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827	**MICRO-BCD #827** BEAM: Collision Area (C-0) B Physics at the TEV I: Micro-BCD	**Nigel S. Lockyer**	UNIV. OF CALIFORNIA, DAVIS FERMILAB UNIVERSITY OF FLORIDA UNIV. OF ILLINOIS, CHICAGO CIRCLE ILLINOIS INSTITUTE OF TECHNOLOGY UNIVERSITY OF IOWA UNIVERSIDAD DE LOS ANDES(COLOMBIA) 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** BEAM: Collision Area (Miscellaneous) Letter of Intent to Measure CP Violation in B Meson Decay at the Fermilab Collider	**Sheldon L. Stone**	FERMILAB UNIVERSITY OF FLORIDA UNIVERSITY OF MICHIGAN SYRACUSE UNIVERSITY
	Request 26 Sep, 90 Unspecified Withdrawn 22 Jun, 91		
829	**HEAVY FLAVORS AT TPL #829** BEAM: Proton Area - East E-791 Continued Study of Heavy Flavors at TPL	**Jeffrey A. Appel and Milind Vasant Purohit**	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** BEAM: Collision Area (B-0) Proposal for an Upgraded CDF Detector	**Melvyn Jay Shochet and Alvin V. Tollestrup**	ARGONNE NATIONAL LABORATORY BRANDEIS UNIVERSITY UNIV. OF CALIFORNIA, LOS ANGELES UNIVERSITY OF CHICAGO FERMILAB INFN, FRASCATI (ITALY) HARVARD UNIVERSITY UNIVERSITY OF ILLINOIS, CHAMPAIGN JOHNS HOPKINS UNIVERSITY KEK (JAPAN) LAWRENCE BERKELEY LABORATORY UNIVERSITY OF MICHIGAN 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 TEXAS A&M UNIVERSITY UNIVERSITY OF TSUKUBA (JAPAN) TUFTS UNIVERSITY UNIVERSITY OF WISCONSIN-MADISON
	Request 9 Oct, 90 Unspecified Unscheduled 11 Jul, 91		
831	**HEAVY QUARK PHOTOPRODUCTION #831** BEAM: Proton Area - Broad Band Expression of Intention to Continue the Study of States Containing Heavy Quarks Using the Wideband Photon Beam and the E687 Multiparticle Spectrometer	**John P. Cumalat**	INFN, BOLOGNA (ITALY) UNIV. OF CALIFORNIA, DAVIS C.I.E.A.-I.P.N. (MEXICO) UNIVERSITY OF COLORADO AT BOULDER FERMILAB INFN, FRASCATI (ITALY) UNIVERSITY OF ILLINOIS, CHAMPAIGN 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 WESTERN KENTUCKY
	Request 17 Oct, 90 Unspecified Unconsidered 17 Oct, 90		
832	**CP VIOLATION #832** BEAM: Meson Area - Center Proposal for a New Tevatron Search for Direct CP Violation in the 2pi decays of the Neutral Kaon	**Yee Bob Hsiung and Bruce D. Winstein**	UNIV. OF CALIFORNIA, LOS ANGELES UNIVERSITY OF CHICAGO ELMHURST COLLEGE FERMILAB UNIVERSITY OF ILLINOIS, CHAMPAIGN RUTGERS UNIVERSITY
	Request 18 Oct, 90 Unspecified Deferred 10 Jul, 91		

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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
Unconsidered	19 Oct, 90	

835 CHARMONIUM STATES #835 — **Rosanna Cester**

BEAM: Accumulator Ring
CHARMONIUM STATES #835

UNIV. OF CALIFORNIA, IRVINE
FERMILAB
UNIVERSITY OF FERRARA (ITALY)
INFN, GENOVA (ITALY)
NORTHWESTERN UNIVERSITY
PENNSYLVANIA STATE UNIVERSITY
UNIVERSITY OF TORINO (ITALY)

Request	16 Oct, 90	Unspecified
Unconsidered	16 Oct, 90	

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
Unconsidered	12 Oct, 90	

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)
RICE UNIVERSITY
IHEP, SERPUKHOV (USSR)
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

840 SPAGHETTI CALORIMETRY TEST #840 — **Adam Para**

BEAM: Meson Area - Polarized Proton Beam
Spaghetti calorimetry in '91 test beam cycle

FERMILAB

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	

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841 CALORIMETER BEAM TEST #T841 — Lawrence E. Price

BEAM: Meson Area - Test Beam
Proposal for Beam Test of Scintillator Calorimeter Prototypes at Fermilab during FY 1991

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

Request	8 Oct, 90	Unspecified
Approval	28 Mar, 91	Unspecified
Completed	8 Jan, 92	Unspecified

842 RADIATION EXPOSURE #842 — David G. Underwood

BEAM: Proton Area - Broad Band
Proposed Radiation Measurement in the Wideband Neutral Dump Area

ARGONNE NATIONAL LABORATORY

Request	6 Nov, 90	Unspecified
Approval	15 Aug, 91	Unspecified
Completed	8 Jan, 92	Unspecified

843 EMULSION EXPOSURE 600 GeV #843 — C. O. Kim

BEAM: Neutrino Area - Muon Beam
Interactions of 600 Gev Muons with Emulsion Nuclei

CHONNAM NATIONAL UNIVERSITY(KOREA)
KOREA UNIVERSITY, SEOUL (KOREA)

Request	24 Oct, 90	Unspecified
Approval	1 Jul, 91	Unspecified
Completed	13 Jul, 91	Unspecified

844 TRD/SHOWER COUNTER TEST #844 — Simon P. Swordy

BEAM: Meson Area - Polarized Proton Beam
Transition Radiation Detector/EM Shower Counter Calibration

ENRICO FERMI INSTITUTE

Request	28 Nov, 90	40 Hours
Approval	11 Oct, 91	Unspecified
Completed	26 Dec, 91	Unspecified

845 TEVATRON BEAUTY #845 — Peter E. Schlein

BEAM: Unspecified Beam
A Dedicated Beauty Experiment for the Tevatron Collider

UNIV. OF CALIFORNIA, LOS ANGELES
CERN (SWITZERLAND)
COLLEGE DE FRANCE (FRANCE)
INP, KRAKOW (POLAND)
MAX-PLANCK INSTITUTE (GERMANY)
NANJING UNIVERSITY (PRC)
IHEP, SERPUKHOV (USSR)
YALE UNIVERSITY

Request	7 Jan, 91	Unspecified
Rejected	10 Jul, 91	

846 FRACTIONAL CHARGE IMPURITIES #846 — Unil Perera

BEAM: Meson Area - West
Search for Fractional Charge Impurities

UNIVERSITY OF PITTSBURGH

Request	1 Feb, 91	Unspecified
Unconsidered	1 Feb, 91	

847 CALORIMETER TEST #847 — Lawrence R. Sulak

BEAM: Unspecified Beam
Beam Test for scintillating fiber / lead alloy calorimeter prototype

BOSTON UNIVERSITY

Request	13 Feb, 91	Unspecified
Unconsidered	13 Feb, 91	

848 GAS CALORIMETRY FOR SDC #848 — Nikos Giokaris

BEAM: Neutrino Area - Test Beam
High Pressure Sampling Gas Calorimetry for the SDC Calorimeter

ABILITY ENGINEERING TECHNOLOGY
FERMILAB
JINR, DUBNA (USSR)
UNIVERSITY OF ROCHESTER
ROCKEFELLER UNIVERSITY
UNIVERSITY OF WISCONSIN-MADISON
YEREVAN PHYSICS INSTITUTE (USSR)

Request	29 Mar, 91	Unspecified
Approval	29 Oct, 91	Unspecified
Completed	23 Dec, 91	Unspecified

849 BARIUM FLUORIDE CALORIMETER #849 — Hans G. E. Kobrak

BEAM: Neutrino Area - Test Beam
Request for Test Beam Time for Barium Fluoride Calorimeter Development

BROOKHAVEN NATIONAL LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIV. OF CALIFORNIA, SAN DIEGO
CARNEGIE-MELLON UNIVERSITY
OAK RIDGE NATIONAL LABORATORY
PRINCETON UNIVERSITY
TATA INSTITUTE (INDIA)

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	

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
Completed	8 Jan, 92	Unspecified

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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 (USSR)
UNIVERSITY OF NEW MEXICO
IHEP, SERPUKHOV (USSR)
SSC LABORATORY
NPI, ST. PETERSBURG (USSR)
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.
Unconsidered	22 May, 91	

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
Unconsidered	11 Jul, 91	

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 (USSR)

Request	10 Dec, 91	Unspecified
Unconsidered	10 Dec, 91	

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 (USSR)
KEK (JAPAN)
UNIVERSITY OF MICHIGAN
MOSCOW STATE UNIVERSITY (USSR)
UNIVERSITY OF NORTH CAROLINA
IHEP, SERPUKHOV (USSR)

Request	6 Jan, 92	Unspecified
Unconsidered	6 Jan, 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	

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
Unconsidered	14 Jan, 92	

☆ U.S. Government Printing Office: 1992—644-115