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THE STATUS OF EXPERIMENTS AT FERMI NATIONAL ACCELERATOR LABORATORY

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ABSTRACT

A summary is given of the status of experiments at the Fermi National Accelerator Laboratory as of January 1, 1976. This information is also compiled in a way that describes the overall extent of the experimental research program.

An objective in writing this paper is to provide a summary of the status of particle physics experiments at the Fermi National Accelerator Laboratory. This is best done in the somewhat extensive Table 2 described later in this paper. However, in order to understand that table it is necessary to furnish information on the available beams and facilities at Fermilab. That necessary information is also provided here.

The proton synchrotron at the Fermi National Accelerator Laboratory has been operating steadily during the last year for particle physics experiments. From the winter of 1973 until summer,

1975, the energy of the Main Ring accelerator was normally at 300 GeV. During this past summer the energy was raised to 400 GeV and operation at this higher energy is expected to continue for the near future.

The accelerated beam flux recently reached 2×10^{13} protons per pulse. Plans are underway to push this value much closer to the goal of 5×10^{13} protons per pulse. The achievements of intensity and energy since operation began in 1972 are described in Fig. 1. The dates correspond to the times when notable advances were made. Meanwhile preparations are underway for construction of a superconducting accelerator inside the existing tunnel of the Main Accelerator. Using that ring it is expected eventually to be able to raise the energy of the accelerator to 1000 GeV.

Normally at 400 GeV the synchrotron operates with a 10-sec cycle. During that cycle beam is available to experiments in the external areas (Meson, Proton, and Neutrino Areas) for about 1 sec. However, the experiments located at the Internal Target Area within the Main Ring accelerator tunnel can benefit by using the circulating beam for an additional 2.5 sec. Normally the beam is extracted during the flattop of the Main Ring for 1 sec using the techniques of resonant extraction. At the end of the flattop the remaining beam is frequently kicked out in a fast pulse for study of neutrino interactions in electronic detectors or in the 15-foot bubble chamber.

The particle beams and research facilities at Fermilab are described in Fig. 2. The proton beam to the external areas is divided

three ways to primary target locations in the Proton, Meson, and Neutrino Areas. The Meson Area has the largest number of secondary beams, all originating at a single production target. In the Neutrino Area are the most complicated beams with two of these, the neutrino (N0) and muon (N1) beams, requiring the largest fluxes of primary protons to produce a satisfactory number of particles. The experiments in the Proton Area are located in pits 12 feet below ground level. In this way use is made of the surrounding earth for shielding from muon background. As mentioned above, experiments are also located within the Main Accelerator tunnel; these make use of low density targets which interact with the circulating proton beam. An advantage of running experiments at that location is that when the accelerator is operating, a beam of protons is constantly available at energies from 8 GeV to the highest energy of the accelerator.

Most of the general experimental facilities at Fermilab are also described in Fig. 2. Those in the Meson Area are the Multiparticle and Single Arm Spectrometers. In the Neutrino Area are two large electronic experiments for study of neutrino interactions and another multiparticle spectrometer primarily used for the study of muon interactions. Two bubble chambers are also located in the Neutrino Area. The 30-inch diameter chamber is used for the study of charged hadron interactions using the N3 beam, and the 15-foot chamber is used both for the study of neutrino and hadron interactions, the latter using the N5 beam.

It seems appropriate to turn now to a description of how the beams and research facilities are being used. As of January, 1976, a total of 139 experiments have completed collecting data at Fermilab. Of these, 65 were completed during 1975. An overall view of the proposal and experiment status is given in Table 1. A note of explanation accounts in part for the large number of experimental proposals submitted to Fermilab. It has been found necessary in dealing with the many users of Fermilab and their corresponding multitude of research interests to ask that each major objective or proposition be identified as a separate proposal. The Laboratory has so far received 466 proposals as shown in Table 1, and 234 have been approved for running.

The Experimental Program Situation Report (Table 2) provides a detailed summary of the running status of the approved experiments and also lists the proposals currently being considered. The information for this report was compiled as of January 1, 1976. This report provides the best overview of the progress of the experimental research at Fermilab. The experiments listed first are those which have completed data-taking. From the listed completion dates it is possible to gauge whether published results may be available. In some sense, the remainder of the table contains an abbreviated long-range plan of the Laboratory. It shows those experiments which are now in progress or testing; those experiments to become active later are shown as being installed or to be set up within about a year from

now. The running plans for the other approved experiments in most cases have not yet been formulated. A listing is also given of the proposals actively under consideration. Some of these, if they are approved, will likely move into the program as others are completed.

Experiments and proposals are also separated in the Situation Report (Table 2) into the individual areas and beams where they are or would be located. The identification of these areas and beams is given in the caption of Fig. 2. The individual experiments are shown by proposal or experiment number with an attached short title describing the types of physics to be studied. The Situation Report also contains the name of the spokesperson for the experimental group and the extent of a run obtained so far; the amount of approved running is also listed for many experiments.

The overall extent of the Fermilab research program is given in Table 3. There all the approved experiments and the proposals still being considered are collected into three very general categories: electronic experiments, bubble chamber experiments, and those of other types. The other experiments include those requiring emulsion exposures, target irradiations, and the like. The information in Table 3 is a way of summarizing the material in the Situation Report (Table 2). The hours shown are those obtained so far or those required to finish the remaining approved or proposed experiments; the numbers of bubble chamber pictures are likewise shown.

Further information on the individual experiments and proposals is available in the "Fermilab Research Program Workbook," printed in June, 1975, and in a recently published review report.[1]) It is expected that these publications will be updated regularly.

REFERENCE

[1]) G. Giacomelli, A. F. Greene, and J. R. Sanford, Physics Reports 19C, 169 (1975).

Table 1. Progress with Proposals and Experiments at Fermilab as of January 1, 1976.

Proposals Approved		234
Experiments Completed		
Completed Data Taking	139	
Experiments Underway		
In Progress	21	
In Test Stage	11	
Experiments to be Done		
Being Installed	10	
Set Up Within a Year	28	
Unscheduled	25	
Proposals Being Considered		64
Rejected and Inactive Proposals		168
	TOTAL	466

Table 2. Experimental Program Situation Report.

SITUATION REPORT-JANUARY 1976

FERMI NATIONAL ACCELERATOR LABORATORY

16 JAN 1976

EXPERIMENTAL PROGRAM SITUATION REPORT

THE EXPERIMENTAL PROGRAM SITUATION AT FERMILAB IS SUMMARIZED BELOW. THE EXPERIMENTS ARE LISTED SEPARATED BY EXPERIMENTAL AREA UNDER CATEGORIES THAT BEST DESCRIBE THEIR CIRCUMSTANCE AS OF JANUARY 1, 1976. FOR EXPERIMENTS WHICH HAVE BEEN COMPLETED OR HAVE RECEIVED BEAM THERE IS INDICATION OF THE AMOUNT OF RUNNING TIME OR EXPOSURE. THE EXPERIMENTAL AREA NAMES ARE ABBREVIATED AS FOLLOWS: INTERNAL TARGET AREA (ITA), MESON AREA (MA), NEUTRINO AREA (NA), PROTON AREA (PA).

TOTAL NUMBER OF APPROVED EXPERIMENTS - 234

AREA-BEAM		SPOKESPERSON	EXTENT OF RUN TO DATE	DATE COMPLETED
A. EXPERIMENTS THAT HAVE COMPLETED DATA TAKING (139):				
MA -M1	ELASTIC SCATTERING #7	MEYER	2,350 HOURS	28 JAN 75
	FORM FACTOR #216	STORK	900 HOURS	1 OCT 75
	DETECTOR DEVELOPMENT #229	YUAN	300 HOURS	16 NOV 74
	DETECTOR DEVELOPMENT #261	WANG	600 HOURS	20 NOV 74
	MUON SEARCH #335	FACKLER	300 HOURS	6 JUN 75
	PARTICLE SEARCH #416	LUBATTI	400 HOURS	1 JUL 75
-M2	MULTIGAMMA #22	COLLINS	350 HOURS	26 JUN 74
	MISSING MASS #51A	VON GOELER	800 HOURS	23 OCT 74
	QUARK #75	YAMANOUCHI	1,050 HOURS	8 SEP 73
	BEAM DUMP #108	AWSCHALOM	350 HOURS	2 JUN 75
	PION CHARGE EXCHANGE #111	TOLLESTRUP	1,800 HOURS	19 SEP 74
	PARTICLE SEARCH #365	GARELICK	200 HOURS	5 FEB 75
-M3	NEUTRON CROSS SECTION #4	LONGO	1,450 HOURS	20 MAR 74
	NEUTRON BACKWARD SCATTERING #12	REAY	1,300 HOURS	2 DEC 74
	NEUTRON DISSOCIATION #27A	ROSEN	850 HOURS	24 APR 74
	MULTIGAMMA #230	LONGO	50 HOURS	24 APR 74
	NEUTRON DISSOCIATION #305	GOBBI	1,400 HOURS	14 APR 75
-M4	QUARK #72	LEIPUNER	500 HOURS	11 JUN 73
	K ZERO REGENERATION #82	TELEGDI	3,500 HOURS	5 JUL 75
	PARTICLE SEARCH #330	GUSTAFSON	150 HOURS	7 JUL 75
-M6	ELASTIC SCATTERING #96	RITSON	2,550 HOURS	17 FEB 75
	MULTIPLICITIES #178	BUSZA	800 HOURS	14 AUG 75
-OTHER	EMULSION/PROTONS @ 200 #90	WOLTER	4 STACKS	20 SEP 72
	EMULSION/PROTONS @ 200 #103	KING	1 STACK	20 SEP 72
	EMULSION/PROTONS @ 200 #105	MALHOTRA	1 STACK	20 SEP 72
	EMULSION/PROTONS @ 200 #114	JAIN	1 STACK	20 SEP 72
	EMULSION/PROTONS @ 200 #116	HEBERT	5 STACKS	20 SEP 72
	EMULSION/PROTONS @ 200 #117A	KUSUMOTO	11 STACKS	20 SEP 72
	EMULSION/PROTONS @ 200 #156	NTU	13 STACKS	20 SEP 72
	EMULSION/PROTONS @ 200 #171	LORD	6 STACKS	20 SEP 72
	EMULSION/PROTONS @ 200 #183	TRETJAKOVA	3 STACKS	20 SEP 72
	EMULSION/PROTONS @ 200 #189	RITSON	2 PLATES FROM EXP #171	20 SEP 72
	SUPER-HEAVY ELEMENTS #147	DEBEAUVAIS	4 EXPOSURES	11 JUN 75
	DI-MUON #337	EARTLY	5 HOURS	7 FEB 75
	SUPER-HEAVY ELEMENTS #371	JURIC	2 STACKS	20 DEC 75
	FRAGMENTATION PARTICLES #426	FUKUI	8 STACKS	18 AUG 75
NA -NEUTRINO	NEUTRINO #1A	CLINE	2,850 HOURS	30 JUN 75
	15-FOOT NEUTRINO/H2ENE #28A	FRY	97K PIX	11 JUN 75
	15-FOOT ANTI-NEUTRINO/H2ENE#180	ERMOLOV	76K PIX	2 JUN 75
	NEUTRINO #21A	BARISH	2,450 HOURS	2 NOV 75
	15-FOOT EMI TEST #155	PETERSON	14K PIX	30 NOV 74
	NEUTRINO #254	KALBFLEISCH	550 HOURS	15 OCT 75
	NEUTRINO #262	BARISH	400 HOURS	20 MAR 74
	NEUTRINO #320	SCIULLI	500 HOURS	1 OCT 74
	NEUTRINO #370	CLINE	400 HOURS	19 MAR 75
-MUON/HADRON	MUON #26	HAND	900 HOURS	16 APR 74
	MUON #98	ANDERSON	1,800 HOURS	17 FEB 75
	PARTICLE SEARCH #382	HAND	200 HOURS	19 DEC 75
-15-FT	15-FOOT ENGINEERING RUN #234	HUSON	57K PIX	5 NOV 74
	15-FOOT P - P @ 400 #341	KO	34K PIX	21 DEC 75
-30-IN	30-INCH HYBRID #28	SMITH	479K PIX	22 APR 74
	30-INCH P-P @ 300 #37A	MALAMUD	51K PIX	1 JUN 73
	30-INCH PI+ & P - P @ 100 #121A	LANDER	104K PIX	23 JAN 74
	30-INCH PI- - P @ 100 #125	MORRISON	53K PIX	28 AUG 73
	30-INCH PI- - P @ 200 #137	HUSON	48K PIX	10 MAR 73
	30-INCH P-P @ 400 #138	VANDER VELDE	52K PIX	26 AUG 75
	30-INCH P-P @ 200 #141A	FIELDS	67K PIX	27 NOV 72
	30-INCH PI- - P @ 300 #143A	KALBFLEISCH	51K PIX	10 APR 74
	30-INCH HYBRID #154	PLESS	105K PIX	13 MAR 74
	30-INCH P - PENE @ 300 #161	MAPP	51K PIX	25 JUN 74
	30-INCH PI- - PENE @ 200 #163A	WALKER	52K PIX	18 JUN 74
	30-INCH P - D @ 400 #196	ENGELMANN	109K PIX	20 OCT 75
	30-INCH P - D @ 300 #209	DAO	106K PIX	7 OCT 75
	30-INCH PI+ & P - P @ 200 #217	LANDER	85K PIX	15 MAY 74
	30-INCH PI- - D @ 200 #218	YAGER	72K PIX	18 SEP 74
	30-INCH PI+ & P - P @ 60 #228	FERBEL	37K PIX	15 APR 74
	30-INCH P-P @ 100 #252	FERBEL	33K PIX	6 DEC 72
	30-INCH P - D @ 200 #280	FIELDS	103K PIX	11 OCT 75
	30-INCH HYBRID #281	SMITH	301K PIX	28 SEP 75
	30-INCH PI+ & P - D @ 200 #295	YEKUTIELI	156K PIX	2 NOV 75
	30-INCH PBAR - P @ 100 #311	NEALE	98K PIX	27 JAN 75
-OTHER	MONOPOLE #3	EBERHARD	4 TARGETS EXPOSED	4 SEP 74
	PROTON-PROTON INELASTIC #14A	FRANZINI	140 HOURS	21 JUN 73
	MONOPOLE #76	CARRIGAN	5 TARGETS EXPOSED	1 DEC 74
	LONG-LIVED PARTICLES #115	STEVENSON	6 HOURS	23 NOV 74
	SUPER-HEAVY ELEMENTS #142	STOUGHTON	1 TARGET	4 JUN 75
	MASSIVE PARTICLE SEARCH #199	FRANKEL	2 TARGETS EXPOSED	22 AUG 73
	BEAM DUMP #211	GOEBEL	2 HOURS	14 NOV 73
	LONG-LIVED PARTICLES #239	FRATI	350 HOURS	3 FEB 74
	QUARK #276	VAN GINNEKIN	3 TARGETS EXPOSED	2 NOV 75
	DETECTOR DEVELOPMENT #34	HIGGETT	50 HOURS	26 JUN 74
	QUARK #297	LEIPUNER	50 HOURS	10 JUL 74
	DETECTOR DEVELOPMENT #327	ALLISON	50 HOURS	7 FEB 75
	EMULSION/PROTONS @ 300 #181	CARY	3 STACKS	20 OCT 73
	EMULSION/PROTONS @ 300 #195	LIM	3 STACKS	10 JUN 75
	EMULSION/PROTONS @ 300 #232	KING	2 STACKS	20 OCT 73
	EMULSION/PROTONS @ 300 #233	HEBERT	8 STACKS	20 OCT 73
	EMULSION/PROTONS @ 300 #237	LORD	5 STACKS	10 JUN 75
	EMULSION/PROTONS @ 300 #242	NTU	2 STACKS	20 OCT 73
	EMULSION/PROTONS @ 300 #244	JAIN	1 STACK	20 OCT 73
	EMULSION/PROTONS @ 300 #250	KUSUMOTO	1 STACK	20 OCT 73
	EMULSION/PROTONS @ 300 #275	ENGE	4 STACKS	20 OCT 73
	EMULSION/PROTONS @ 300 #329	TRETJAKOVA	2 STACKS	10 JUN 75
	EMULSION/PROTONS @ 300 #374	DAVIS	1 STACK	10 JUN 75
	EMULSION/PROTONS @ 300 #419	GIACOMELLI	1 STACK	10 JUN 75
	EMULSION/PROTONS @ 300 #421	DZHELEPOV	1 STACK	24 JUN 75
	EMULSION/PROTONS @ 200 #271	GOTTFRIED	10 STACKS	10 JUN 75
	EMULSION/MUONS @ 150 #255	JAIN	1 STACK	16 OCT 73
	EMULSION/MUONS @ 150 #205A	KUSUMOTO	2 STACKS	16 OCT 73
	EMULSION/PI- @ 200 #264	YOUNG	2 STACKS	7 OCT 74
	EMULSION/PI- @ 200 #328	TRETJAKOVA	5 STACKS	7 OCT 74
	EMULSION/PI- @ 200 #339	WOLTER	4 STACKS	9 JUN 75

AREA-BEAM		SPOKESPERSON	EXTENT OF RUN TO DATE	DATE COMPLETED
	EMULSION/PI- @ 200 #362	JAIN	1 STACK	9 JUN 75
	EMULSION/PI- @ 200 #387	WILKES	4 STACKS	9 JUN 75
	EMULSION/PROTONS @ 400 #238	LORD	9 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #243	NIU	7 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #245	JAIN	1 STACK	9 DEC 75
	EMULSION/PROTONS @ 400 #249	WOLTER	3 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #251	KUSUMOTO	3 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #265	YOUNG	3 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #279	KING	3 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #292	GOTTFRIED	12 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #336	OGATA	2 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #346	EKSPONG	1 STACK	9 DEC 75
	EMULSION/PROTONS @ 400 #385	PRAKASH	1 STACK	9 DEC 75
	EMULSION/PROTONS @ 400 #423	SUGIMOTO	4 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #428	HERFRT	14 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #434	DAKE	3 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #461	LORD	6 STACKS	9 DEC 75
	EMULSION/PROTONS @ 400 #467	GIACOMELLI	1 STACK	9 DEC 75
	EMULSION/PROTONS @ 400 #463	TRETJAKOVA	2 STACKS	9 DEC 75
PA -PE	PHOTOPRODUCTION #87A	LEE	2,500 HOURS	21 DEC 75
	PARTICLE SEARCH #100A	PIROUE	1,150 HOURS	4 APR 74
	DI-MUON #358	LEE	400 HOURS	1 OCT 75
-PC	MUON SEARCH #48	ADAIR	500 HOURS	1 DEC 75
	LEPTON #70	LEDERMAN	2,800 HOURS	1 DEC 74
	PARTICLE SEARCH #187	LEDERMAN	200 HOURS	6 NOV 73
	DI-MUON #436	ADAIR	200 HOURS	29 OCT 75
ITA-C-D	PROTON-PROTON SCATTERING #36A	COOL	700 HOURS	24 JUN 73
	PHOTON SEARCH #63A	WALKER	2,600 HOURS	13 MAR 75
	PROTON-PROTON MISSING MASS #67A	SANNES	600 HOURS	8 AUG 73
	PHOTON SEARCH #120	CLINE	1,200 HOURS	29 MAY 73
	PARTICLE SEARCH #184	WANDERER	800 HOURS	29 MAY 74
	PROTON-DEUTERON SCATTERING #186	MELTSSINOS	450 HOURS	19 AUG 74
	PROTON-NUCLEON INCLUSIVE #188	SANNES	1,050 HOURS	9 MAY 73
	PROTON-PROTON INELASTIC #221	FRANZINI	950 HOURS	5 SEP 74
	PROTON-NUCLEON INELASTIC #317	MUKHIN	1,400 HOURS	1 NOV 75
	PARTICLE SEARCH #363	OLSEN	650 HOURS	9 APR 75
	PARTICLE PRODUCTION #418	SANNES	900 HOURS	22 OCT 75

B. EXPERIMENTS THAT ARE IN PROGRESS (21):

NA -M1	TOTAL CROSS SECTION #104	KYCIA	1,400 HOURS
-M2	NEUTRAL HYPERON #8	PONDROM	2,500 HOURS
	PARTICLE SEARCH #357	MEYER	950 HOURS
	INCLUSIVE PHOTON #268	MELLEMA	1,450 HOURS
-M3	NEUTRON ELASTIC SCATTERING #248	LONGO	1,000 HOURS
-M6	ELASTIC SCATTERING #69A	MARX	2,400 HOURS
-OTHER	NUCLEAR CHEMISTRY #81A	KAUFMAN	120 BOMBARDMENTS
NA -NEUTRINO	15-FOOT NEUTRINO/H2 #45A	ROE	138K PIX
	15-FOOT ANTI-NEUTRINO/H2 #31A	DERRICK	26K PIX
-MUON/HADRON	DI-MUON #331	PILCHER	650 HOURS
-15-FT	15-FOOT P - P @ 300 #343	ENGELMANN	7K PIX
	15-FOOT PI- - P @ 100 #83A	KITAGAKI	11K PIX
	15-FOOT PI- - PENE @ 200 #89	FRETTER	4K PIX
-30-IN	30-INCH P - D @ 100 #194	MURPHY	41K PIX
	30-INCH HYBRID #299	PLESS	158K PIX
-OTHER	SUPER-HEAVY ELEMENTS #285	LEDERMAN	3 TARGETS EXPOSED
	TACHYON MONOPOLE #202	BARTLETT	COSMIC RAY RUNNING
PA -PE	PHOTON TOTAL CROSS SECTION #25A	CALDWELL	400 HOURS
-PC	DI-LEPTON #288	LEDERMAN	1,350 HOURS
-PW	PHOTON SEARCH #95A	COX	850 HOURS
	PARTICLE PRODUCTION #284	WALKER	350 HOURS

C. EXPERIMENTS THAT ARE IN TEST STAGE (11):

NA -M1	HADRON JETS #236A	MOCKETT	750 HOURS
	POLARIZED SCATTERING #61	CHAMBERLAIN	250 HOURS
-M3	PARTICLE SEARCH #397	ROSEN	200 HOURS
-M4	K ZERO REGENERATION #425	TELEGDI	350 HOURS
-M6	HADRON JETS #260	MCLEOD	1,150 HOURS
	INCLUSIVE SCATTERING #118A	FRIEDMAN	350 HOURS
NA -NEUTRINO	PARTICLE SEARCH #247	BURHOP	
PA -PW	PROTON-PROTON ELASTIC #177A	OREAR	150 HOURS
ITA-C-D	PROTON-PROTON INELASTIC #321	LEE-FRANZINI	200 HOURS
	PROTON-NUCLEON SCATTERING #198A	OLSEN	200 HOURS
	PROTON-PROTON POLARIZATION #313	NEAL	200 HOURS

D. EXPERIMENTS BEING INSTALLED (10):

			EXTENT OF APPROVAL
NA -M1	INCLUSIVE SCATTERING #324	WEISBERG	500 HOURS
	PION DISSOCIATION #86A	LUBATTI	500 HOURS
	FORM FACTOR #456	STORK	500 HOURS
-M3	PARTICLE SEARCH #366	ABOLINS	1,200 HOURS
-M6	MULTIPARTICLE #110A	MCLEOD	750 HOURS
NA -NEUTRINO	NEUTRINO #310	CLINE	1,000 HOURS
-15-FT	PARTICLE SEARCH #379	WOJCICKI	200 HOURS
PA -PF	PARTICLE SEARCH #300	CRONIN	600 HOURS
	PARTICLE SEARCH #329	CRONIN	300 HOURS
ITA-C-D	PROTON-NUCLEON SCATTERING #381	MALAMUD	300 HOURS

E. EXPERIMENTS TO BE SET UP WITHIN A YEAR (28):

NA -M1	PARTICLE SEARCH #354	BAKER	200 HOURS
-M2	INCLUSIVE NEUTRAL MESON #350	KENNEY	400 HOURS
	PARTICLE PRODUCTION #415	PONDROM	100 HOURS
	LAMBDA MAGNETIC MOMENT #440	BUNCE	160 HOURS
	PARTICLE SEARCH #411	GARFLICK	250 HOURS
	PARTICLE SEARCH #413	GARFLICK	150 HOURS
	PARTICLE SEARCH #439	GARFLICK	400 HOURS
	HADRON JETS #395	SELOVE	450 HOURS
-M3	NEUTRON-NUCLEUS INELASTIC #438	JONES	200 HOURS
-M4	TEST K ZERO REGENERATION #226	TELEGDI	500 HOURS

AREA-BEAM		SPOKESPERSON	EXTENT OF APPROVAL
-M6	HADRON DISSOCIATION #396	GOULIANOS	600 HOURS
	BACKWARD SCATTERING #290	BAKER	900 HOURS
	ASSOCIATED PRODUCTION #99	DIEBOLD	500 HOURS
NA -NEUTRINO	15-FOOT NEUTRINO/H2 & NE #53A	BALTAY	100K PIX
	15-FOOT ANTI-NEUTRINO/H2&NE#172	BINGHAM	50K PIX
-MUON/HADRON	MUON #319	CHEN	500 HOURS
	MUON #398	ANDERSON	800 HOURS
-15-FT	15-FOOT PI- - P @ 350 #384	HUSON	50K PIX
	15-FOOT PI- - P @ 100 #429	MORRISON	50K PIX
-30-IN	30-INCH PI+ - D @ 400 #338	MORIYASU	50K PIX
	30-INCH PBAR - P @ 30-60 #344	GUTAY	100K PIX
	30-INCH PBAR - D @ 100 #345	ERSPONG	100K PIX
	30-INCH PI+ & P - P @ 300 #277	BARNES	100K PIX
-OTHER	EMULSION/NEW PARTICLES #386	LORD	EMULSION EXPOSURE
PA -PE	PARTICLE SEARCH #400	PEOPLES	400 HOURS
-PC	MUON SEARCH #435	ADAIR	250 HOURS
ITA-C-O	PROTON-HELIUM SCATTERING #289	MALAMUD	700 HOURS
	NUCLEAR FRAGMENTS #442	TURKOT	400 HOURS

F. OTHER APPROVED EXPERIMENTS (25):

NA -M1	HADRON DISSOCIATION #277	FERBEL	600 HOURS
-M2	LAMBDA POLARIZATION #441	PONDROM	150 HOURS
	CHARGED HYPERON #97	LACH	400 HOURS
-M6	FORM FACTOR #446	ANKENBRANDT	500 HOURS
NA -NEUTRINO	15-FOOT NEUTRINO/D2 #151A	SNOW	100K PIX
	15-FOOT NEUTRINO/D2 #227	ENGELMANN	100K PIX
	15-FOOT ANTI-NEUTRINO/D2 #390	GARFINKEL	300K PIX
	NEUTRINO #356	BARISH	1,000 HOURS
	NEUTRINO #253	MO	1,000 HOURS
	15-FOOT NEUTRINO/H2 & NE #380	BALTAY	200K PIX
	15-FOOT ANTI-NEUTRINO/H2&NE#388	STEVENSON	200K PIX
-MUON/HADRON	DI-MUON #444	SMITH	400 HOURS
	MUON #203A	KERTH	500 HOURS
	MUON #391	KERTH	250 HOURS
-30-IN	30-INCH P - P @ 300 #207	ENGELMANN	50K PIX
-OTHER	DETECTOR DEVELOPMENT #206	PETERSON	200 HOURS
PA -PE	PHOTOPRODUCTION #401	GORMLEY	300 HOURS
	PHOTOPRODUCTION #1528	HEUSCH	350 HOURS
	PHI PHOTOPRODUCTION #263	CHEN	600 HOURS
	EMULSION/ELECTRONS @ HI E #340	DAKE	EMULSION EXPOSURE
	EMULSION/ELECTRONS @ >100 #399	GOLDEN	5 STACKS
-PC	PARTICLE SEARCH #372	BECKER	1,400 HOURS
-PW	PION INCLUSIVE #258	PEROUE	800 HOURS
	C-TEST #302	CESTER-REGGE	400 HOURS
	MULTIGAMMA #192	GUIRAGOSSIAN	400 HOURS

PROPOSALS BEING CONSIDERED (64):			EXTENT OF REQUEST
NA -M1	DETECTOR DEVELOPMENT #427	YUAN	50 HOURS
	PSI PRODUCTION #452	LUBATTI	400 HOURS
	MUON SEARCH #453	FRISCH	600 HOURS
-M2	K-SHORT REGENERATION #351	ARONSON	3,000 HOURS
	LAMBDA BETA DECAY #361	MARCH	300 HOURS
-M3	K* PRODUCTION #449	ABOLINS	600 HOURS
-M4	INCLUSIVE K-SHORT #383	KOBRAK	500 HOURS
-M6	INELASTIC SCATTERING #165	RITSON	475 HOURS
	HADRON DISSOCIATION #312	EDELSTEIN	1,000 HOURS
	INCLUSIVE SCATTERING #451	BARTON	600 HOURS
NA -NEUTRINO	NEUTRINO #355	BARISH	1,400 HOURS
	15-FOOT NEUTRINO/H2&NE #389	TENNER	100K PIX
	15-FOOT NEUTRINO/H2 & NE #455	PETERSON	200K PIX
	15-FOOT NEUTRINO/H2 & NE #459	FRY	1,000K PIX
	15-FOOT NEUTRINO/H2 & NE #460	HUSON	200K PIX
-MUON/HADRON	PION DISSOCIATION #318	ASCOLI	400 HOURS
	MUON #348	WILSON	400 HOURS
	PARTICLE SEARCH #369	KIRK	700 HOURS
	DI-MUON #443	PILCHER	400 HOURS
	MUON #448	WILSON	300 HOURS
	TEST PARTICLE SEARCH #457	BRANDENBURG	100 HOURS
-15-FT	15-FOOT KO-P @ 20-60 #65	ALBRIGHT	250K PIX
	15-FOOT PI+ - D @ 40 #85	GUTAY	600K PIX
	15-FOOT K+ - P @ HI E #179	ERWIN	300K PIX
	15-FOOT P - P @ > OR = 300 #208	TAKIBAEV	75K PIX
	15-FOOT SIGMA- - P @ 50-200#214	RUSHBROOKE	275K PIX
	15-FOOT P - P&NE @ 100&400 #291	MANN	50K PIX
	15-FOOT NEUTRON - P@50-250 #303	SEIDL	100K PIX
	15-FOOT PI- - P/NE @ 485 #309	ERWIN	250K PIX
	15-FOOT K- - P @ 200 #333	RUSHBROOKE	100K PIX
	15-FOOT K+ - P @ 200 #334	RUSHBROOKE	100K PIX
	15-FOOT PI- -P/NE @ 200 #342	KENNEY	210K PIX
	15-FOOT SIGMA- - D @ 240 #432	FRIDMAN	60K PIX
-30-IN	30-INCH PCPI- - HI Z @ 200 #224	JONES	100K PIX
	30-INCH P - P&NE @100-500 #273	DREN	50K PIX
	30-INCH PCPI- -PENE@100&400#298	MALHOTRA	15K PIX
	30-INCH PI- - HI Z @ 300 #304	WALKER	200K PIX
	30-INCH K+ - P @ 150 #375	RUBIN	400K PIX
	30-INCH K- - P @ 150 #376	LUDLAM	500K PIX
	30-INCH PI- - P @ 300 #377	HAFEN	200K PIX
	30-INCH PI- - P @ 75 #378	YAMAMOTO	200K PIX
	30-INCH PBAR - P@160 OR 200#392	NEALE	100K PIX
	30-INCH PI- - P @ 150 #393	PLESS	1,000K PIX
	30-INCH PBAR - P @ 100 #394	WHITMORE	2,000K PIX
	30-INCH PI+ - P @ 250 #407	BUGG	300K PIX
	30-INCH PBAR - P @ 75 #408	PLANO	300K PIX
	30-INCH PI+ - P @ 75 #409	WATTS	200K PIX
	30-INCH K+KK- - P @ 75 #410	PEVSNER	1,000K PIX
	30-INCH PBAR - PCD @ 50&80 #422	FRIDMAN	450K PIX
	30-INCH PBAR - P @ 150 #447	HULSIZER	100K PIX
	30-INCH K+ - P @ 150 #464	GRAND	400K PIX
-OTHER	EMULSION/MUONS @ 50-100 #373	JAIN	EMULSION EXPOSURE
	EMULSION/MUONS @ 200 #424	WADA	EMULSION EXPOSURE
PA -PE	PHOTOPRODUCTION #450	CALDWELL	600 HOURS
	PHOTOPRODUCTION #458	LEE	700 HOURS
-PC	CHARGED HYPERON #353	ECKLUND	600 HOURS

AREA-BEAM		SPOKESPERSON	EXTENT OF REQUEST
	PARTICLE SEARCH #465	BECKER	500 HOURS
-PM	HADRON JETS #246	SELOVE	600 HOURS
	ELASTIC SCATTERING #301	GETTNER	1,000 HOURS
	DI-MUON #326	PIROUE	400 HOURS
	ELASTIC SCATTERING #367	WALKER	1,200 HOURS
	HADRON-NUCLEON SCATTERING #420	GUIRAGOSSIAN	1,100 HOURS
	ELECTROPRODUCTION #454	GUIRAGOSSIAN	1,500 HOURS
	NUCLEAR FRAGMENTS #466	KAUFMAN	500 HOURS

Table 3. Extent of the Research Program as of January 1, 1976.

	Number of Exp. /Proposals	
Electronic Experiments		
Complete and In Progress	60	64,000 hours
Accomplished During 1975	(35	27,000)
Planned Within a Year	40	21,000
Unscheduled	16	9,000
Proposals Being Considered	28	20,000
Bubble Chamber Experiments		
Complete and In Progress	33	2,900K pictures
Accomplished During 1975	(14	1,200K)
Planned Within a Year and Remainder for 7 In Progress	8	1,600K
Unscheduled	6	950K
Proposals Being Considered	34	11,400K
Other Experiments		
Complete and In Progress	67	
Accomplished During 1975	(37)	
Planned Within a Year	1	
Unscheduled	3	
Proposals Being Considered	2	

Total Approved Experiments - 234
Total Proposals Being Considered - 64

List of Figure Captions

Fig. 1. Graphical description of progress in achieving proton energies and intensities inside the Main Ring accelerator at Fermilab. On January 20, 1976 an intensity of 2×10^{13} protons per pulse was obtained at 400 GeV.

Fig. 2. Particle beams and research facilities at Fermilab. The individual beams and their general characteristics are listed below.

Meson Area (MA)

- M1 General-Purpose Charged Particle Beam
- M2 Diffracted Proton Beam (sometimes Pions)
- M3 Neutral Beam (Neutrons)
- M4 Neutral Beam (Kaons and Neutrons)
- M6 Charged Particle Beam

Neutrino Area (NA)

- Neutrino Beam (N0)
- Muon/Hadron Beam (N1)
- 15-ft Bubble Chamber Charged Hadron Beam (N5)
- 30-in. Bubble Chamber Charged Hadron Beam (N3)

Proton Area (PA)

P-East (PE)

- Primary Protons
- P1 Neutral Beam (Photons or Neutrons)
- P2 Tagged Photon Beam

P-Center (PC)

- Primary Protons

P-West (PW)

- Primary Protons
- P3 Charged Particle Beam (to be built)

Internal Target Area (ITA) - at C-0

- Primary Protons - circulating inside the Main Accelerator

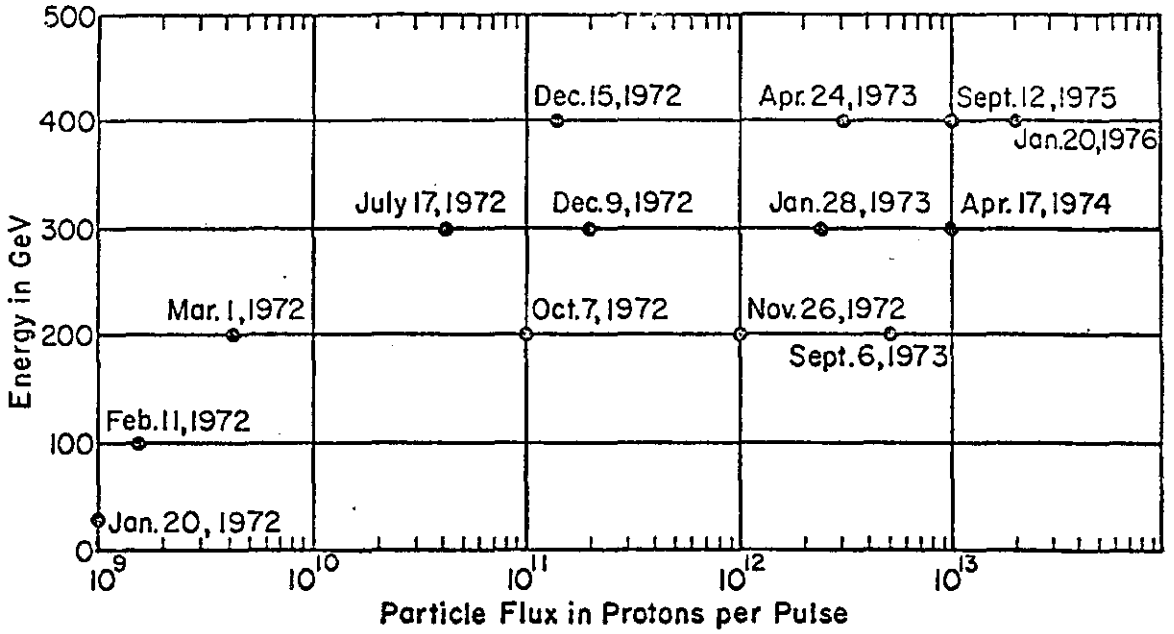
500
400
300
200
100
0
Energy in GeV
Dec.15,1972
Apr.24,1973
Sept.12,1975
Jan.20,1976
July 17,1972
Dec.9,1972
Jan.28,1973
Apr.17,1974
Mar.1,1972
Oct.7,1972
Nov.26,1972
Sept.6,1973
Feb.11,1972
Jan.20,1972
10^9
10^{10}
10^{11}
10^{12}
10^{13}
Particle Flux in Protons per Pulse

Fig. 1

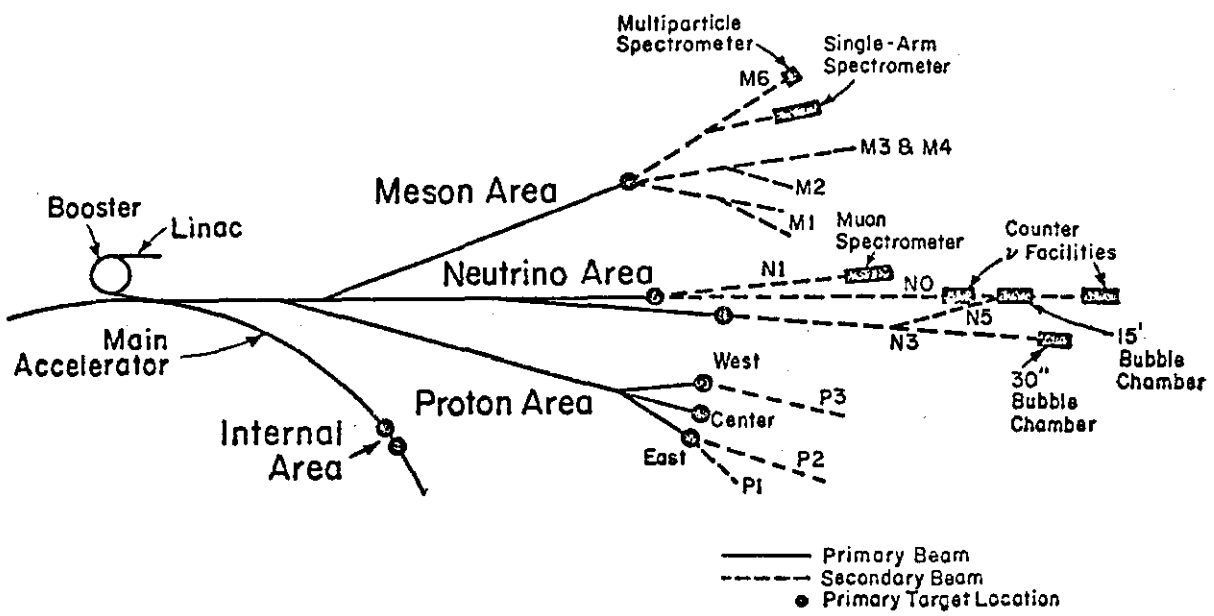
Multiparticle Spectrometer
Single-Arm Spectrometer
M6
M3 & M4
M2
M1
Meson Area
Booster
Linac
Muon Spectrometer
Counter ν Facilities
Neutrino Area
N1
NO
N5
N3
15' Bubble Chamber
30" Bubble Chamber
Main Accelerator
West
P3
Proton Area
Center
Internal Area
East
P2
P1
Primary Beam
Secondary Beam
Primary Target Location

Fig. 2