

FERMILAB AT THE PARTICLE ACCELERATOR CONFERENCE

The 1981 Particle Accelerator Conference was held in Washington on March 11-13, sponsored by the Department of Energy, the National Science Foundation, and the American Physical Society. The Fermilab work was represented by more than 50 papers covering a broad spectrum of advances in all our accelerator efforts.

The nearest-term work was represented by a number of papers reporting on detailed work to understand and improve high-intensity operation of the Booster and Main Ring. This work was vital in the success reported last month in **Fermilab Report**, the achievement of 3×10^{13} protons per pulse and in the excellent reliability of 400-GeV operation.

The next nearest term work reported was on the Energy Saver. Progress on that project is reported separately in this month's **Fermilab Report**. The Energy Saver is building magnets successfully and is also bringing many complex accelerator systems to reality.

Progress was also reported on colliding beams. Since the 1979 Accelerator Conference, stochastic and electron cooling have been demonstrated experimentally at Fermilab (in collaboration with Argonne, Lawrence Berkeley Laboratory, INP, and Wisconsin) and Fermilab people presented a number of papers on the experimental results, on the design of a \bar{p} -production target, on study of dense proton bunches in the Main Ring, and on the design of the Precooler and Electron Accumulator storage rings to be built for \bar{p} accumulation.

In the farther future were proposals to make use of the Precooler as a muon-storage ring to study neutrino oscillations and to improve the operation of the Tevatron by a 120-GeV superbooster. There was also design work reported on the design of an 85-kilogauss superconducting magnet, the next generation after the Tevatron.

Finally, there were a number of basic theoretical investigations reported on studies of nonlinear forces, beam-beam interactions and particle motion in severe space-charge conditions.

These papers, which will be published in the proceedings, are an indication of our work toward the future physics program of Fermilab. A list of accepted papers is appended to this report.



PAPERS SUBMITTED TO THE IEEE 1981 PARTICLE ACCELERATOR
CONFERENCE, WASHINGTON, D. C., MARCH 11-13, 1981

Snapshot Digitizer System for Fermilab Main Accelerator
R. J. Pasquinelli

Preparation and Study of Bunches Containing 10^{11} Protons in the
Fermilab Main Ring
J. E. Griffin, J. A. MacLachlan, and J. F. Bridges

Antiproton Collection from a Production Target
F. Krienen and J. A. MacLachlan

Electron Cooling Experiments at Fermilab
R. Forster, T. Hardek, D. E. Johnson, W. Kells,
V. Kerner, H. Lai, A. J. Lennox, F. Mills, Y. Miyahara,
L. Oleksiuk, R. Peters, T. Rhoades, D. Young, and
P. M. McIntyre

Electron Cooling for the Fermilab \bar{p} Source
W. Kells, F. Krienen, F. Mills, L. Oleksiuk, J. Peoples,
and P. M. McIntyre

The Fermilab Proton-Antiproton Collider
D. E. Young

Improved FNAL Linac Beam Choppers
K. Bourkland, C. Curtis, G. Lee, and G. Tool

The Tevatron Control System
D. Bogert, L. J. Chapman, R. J. Ducar, and S. L. Segler

A 120-GeV Superbooster for Fermilab
F. R. Huson

An RF Beam Position Measurement Module for the Fermilab Energy
Doubler
S. P. Jachim, R. C. Webber, and R. E. Shafer

Fermilab Power Monitor
R. Gerig and H. Pfeffer

Multi-Level Computer Simulation of the Energy Saver Cooling
Provisions
H. R. Barton, Jr., G. T. Mulholland, and J. E. Nicholls

Large Dynamic Range Beam Profile Measurement in a High Back-
ground Environment
W. Merz, R. Dixon, M. Harrison, and J. McCarthy

Review of the Fermilab Main Ring Accelerator Study Program as
Directed to the PP Program
J. E. Griffin, J. A. MacLachlan, and J. F. Bridges

A Vacuum Control Subsystem for the Fermilab Tevatron
J. R. Zagel and L. J. Chapman

Tevatron Satellite Refrigeration Control Subsystem
J. R. Zagel, D. Bogert, L. J. Chapman, R. J. Ducar,
J. C. Gannon, M. Harrison, G. Johnson, M. Martin, and
S. Segler

Magnetostatic Design of 85kG Superconducting Dipoles
S. C. Snowdon

"Arnold Diffusion" and Diffusion Enhancement by the Beam-Beam
Interaction
D. Neuffer, A. Riddiford, and A. G. Ruggiero

Mechanical Design of Lambertson Magnets for Injection into the
Energy Saver
M. May, H. Edwards, M. Harrison, J. Jagger, and
R. Isiminger

Collective Longitudinal Motion in Intense Ion Beams
D. Neuffer

Design of Muon Storage Rings for Neutrino Oscillations Experi-
ments
D. Neuffer

Comments on Stable Motions in Nonlinear Coupled Resonances
H. Ohnuma

Heavy Ion Accelerators for Inertial Fusion
L. C. Teng

Approximate Physical Treatment of the Beam-Beam Effects
L. C. Teng

Status of Efforts to Improve the Transverse Properties of the
Fermilab Booster
C. W. Owen, B. C. Brown, J. Crawford, J. Garvey,
H. Gerzevske, J. Lackey, K. Meisner, and R. Rice

Fermilab Energy Doubler Beam Position Detector
R. E. Shafer, R. C. Webber, and T. H. Nicol

Energy Doubler Vacuum Devices and Controls
L. Bartelson and H. Jöstlein

A CAMAC Serial Crate Controller for the Tevatron Accelerator
R. J. Ducar

Tevatron Serial Data Repeater System
R. J. Ducar

- A 3kG Kicker Magnet System for the Tevatron Beam Abort System
G. Krafczyk, H. Edwards, Q. Kerns, M. May, E. Tilles,
and F. Turkot
- A High Intensity Beam Dump for the Tevatron Beam Abort System
J. Kidd, N. Mokhov, T. Murphy, M. Palmer, T. Toohig,
F. Turkot, and A. VanGinneken
- Spool Piece Testing Facility
M. Kuchnir, R. J. Walker, W. B. Fowler, and
P. M. Mantsch
- Quasi-Optimal Algorithms for the Control Loops of the Fermilab
Energy Saver Satellite Refrigerator
M. Martin, J. Gannon, G. Rode, and J. McGeathy
- Pulsed High Current Optics for \bar{p} Production at 5.4 GeV/c
J. A. MacLachlan, G. Nicholls, J. Nicholls,
G. Silvestrov, and T. Vserolozhskaya
- Very Low Intensity Storage-Ring Profile Monitor
T. Hardek, W. Kells, and H. Lai
- Active Filter for High Current dc Magnets
F. F. Cilyo, F. E. Mills, and Y. Miyahara
- Instrumentation for the Tevatron Abort Dump
E. Harms, B. Hendricks, G. Lee, and T. Williams
- Energy Saver Prototype Accelerating Resonator
Q. Kerns, M. May, H. Miller, J. Reid, F. Turkot,
R. Webber, and D. Wildman
- A Four-Quadrant Magnet Power Supply for Superconducting and
Conventional Accelerator Applications
R. Yarema
- Fermilab Energy Saver Refrigeration System Tests
C. Rode, R. Ferry, M. Leininger, J. Makara, D. Mizicko,
J. Misek, D. Richied, and J. Theilacker
- Progress in Superconducting Magnet Technology for Accelerators/
Storage Rings
A. Tollestrup
- Advanced Stochastic Cooling Mechanisms
W. Kells
- Measurement and Compensation of Coherent Laslett Tune Shifts in
the Fermilab Main Ring
R. Gerig, C. Moore, and S. Pruss
- Beam Quality Measurements in Fermilab Main Ring
R. Gerig, C. Moore, and S. Pruss
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Measurement of Incoherent Laslett Tune Shifts in the Fermilab Main Ring

R. Gerig, C. Moore, and S. Pruss

Correction Magnet Packages for the Energy Saver

D. Ciazynski and P. Mantsch

The Energy Saver/Doubler Quench Protection Monitor System

R. Flora, J. Saarivirta, G. Tool, and D. Voy

Longitudinal Beam Signal Processing for the Fermilab Beam Quality Monitor

E. Higgins and C. Moore

A Microprocessor Based Function Generator for Superconducting Dipole Correction Coils

D. Beechy, D. Bogert, S. Segler, and T. Watts

60 MHz 6 Bit Digital to Analog Converters for the Super Beam Damper of the Fermilab Main Accelerator

R. Pasquinelli

Electron Beam Studies in the Fermilab Electron Cooling Experiment

W. Kells, L. Oleksiuk, and P. McIntyre

Status of Efforts to Improve the Transverse Properties of the Fermilab Booster

C. Owen, B. Brown, J. Crawford, J. Garvey, H. Gerzevske, J. Lackey, K. Meisner, and R. Rice

Water-Cooled Aluminum Coils for a 14.4 m Dipole

R. Fast, E. Bosworth, and J. Jagger

Dependences of the Emittances of the Fermilab Injectors on Intensity

C. Moore, C. Curtis, J. Lackey, C. Owen, C. Ankenbrandt, R. Gerig, and S. Pruss

Improving Regulation in the Fermilab Main Ring Magnet Power Supply System

D. Wolff, H. Pfeffer, C. Briegel, J. Dinkel

Thermodynamic Performance of the Central Liquefier

H. Burton

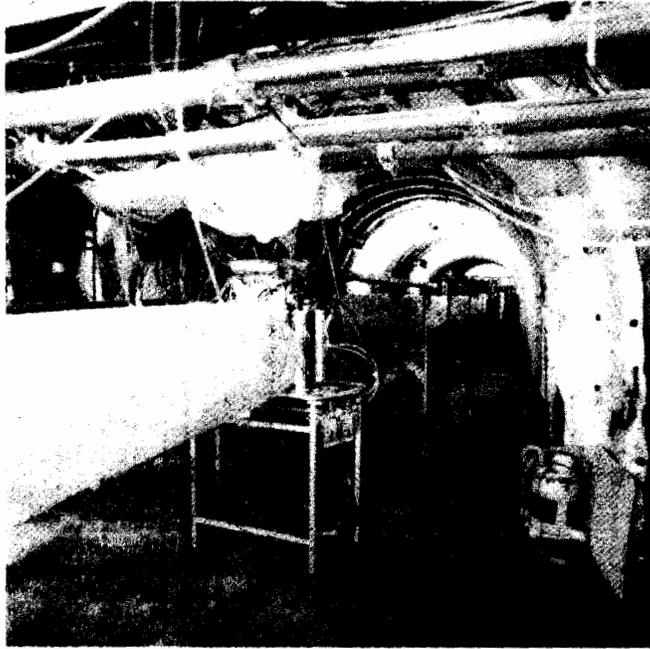
Multilevel Computer Simulation of the Energy Saver Cooling Provisions

G. Mulholland, J. Nicholls

Fermilab Energy Saver Satellite Refrigeration Control Loops

C. Rode, J. Gannon, M. Hentges, and M. Martin

Multiple Element Vapor Cooled Current Leads for the Fermilab
Energy Saver Correction Elements
T: N1881
Doubler Vacuum Devices and Controls
L. Bartelson



The new M6 beam line.
(Photograph by Fermilab Photo Unit)

