ANTIPROTON-PROTON COLLISION WORKSHOP

A lively and productive workshop on High-Luminosity Antiproton-Proton Collisions was held from March 27 to 31 at the Lawrence Berkeley Laboratory, jointly sponsored by LBL and Fermilab. The focus of the workshop was on beam cooling and its use for producing antiproton beams useful for colliding beams.

It is believed by both groups working on adaptations of existing accelerators for $p\bar{p}$ collisions, Fermilab and CERN, that with some development they will be able to achieve luminosities approaching $10^{30}/cm^2$-sec. One of the conclusions of the workshop was that a luminosity of $10^{31}/cm^2$-sec is not beyond the bounds of technical feasibility. Beyond 10^{31}, one may be limited by the increasing size of the beam-beam tune shift. In any case, such higher luminosities may well swamp the detectors planned.

Methods of increasing the luminosity also were made more clear by the work of the meeting. There are significant gains in antiproton production to be made by increased target efficiency, for example by using a field-immersion lens to concentrate the antiprotons as they are produced. Thus higher luminosities appear both useful and feasible.

The theory of cooling also received attention during the week. In the case of stochastic cooling, the theory is well understood for unbunched beams, but is not so clear when bunching is included. Stochastic cooling is more efficient than electron cooling when the antiproton (or more generally, the heavy-particle) beam emittance is large, that is, when its temperature is high. But for a low-temperature beam, electron cooling is more efficient.

One of the outstanding results of the workshop was the demonstration that electron cooling can be done at high energy, say 50 GeV. Budker himself understood that cooling could be done at these high energies and mentioned the possible use of an electron storage ring. The energy given to the electrons by the antiprotons is radiated away by them as synchrotron radiation. Electron storage rings had been considered in the Fermilab studies in 1976 and had shown that reasonable cooling rates could be achieved under some conditions. At the workshop, it was demonstrated that the cooling conditions at 50 GeV (density, temperature, etc.) can be scaled directly from those realized experimentally in the NAP-M work at Novosibirsk.

High-energy cooling is an important new development that may well have profound implications for Fermilab cooling in particular and for accelerator design in general.

NOTES AND ANNOUNCEMENTS

SPECIAL PRESENTATION MEETING FOR HADRON JET PROPOSALS. . .

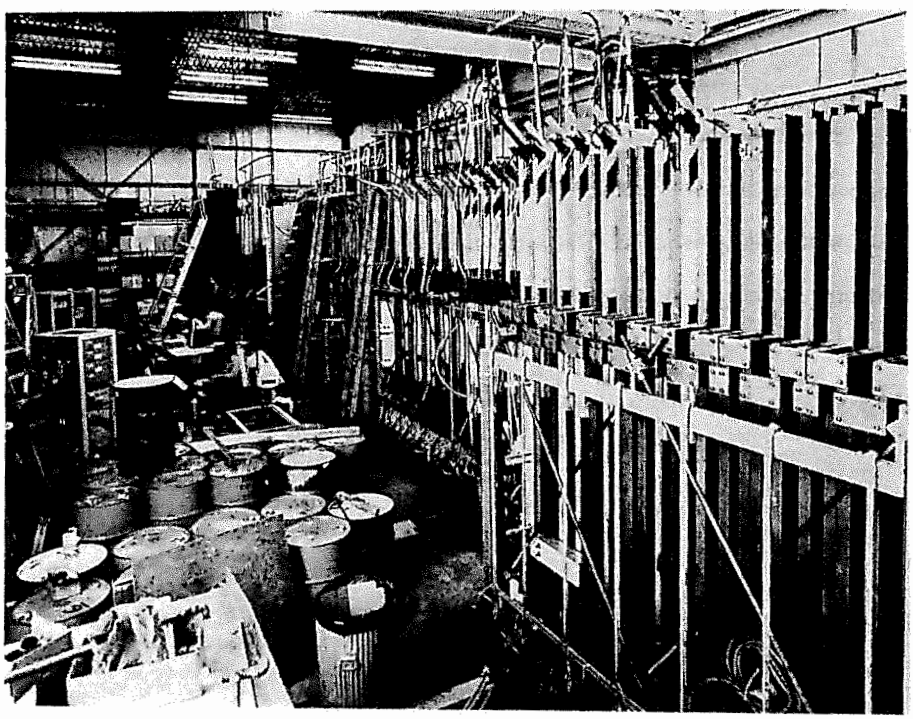
At the request of our Physics Advisory Committee, proposals for hadron jet experiments that are before us for consideration following the May 5 deadline will be presented in a special meeting rather than at the general Proposal Presentation Meeting May 18-20. This special meeting will be held at Fermilab on Friday, June 2. Our plans for that meeting include a presentation on current theoretical interpretations of the significance of hadron jets, a summary of what has been learned to date from hadron-jet experiments already carried out at Fermilab, a review of the objectives of the currently approved hadron-jet experiment E-557 and presentations of the new proposals. At the present time these include P-246 (Selove), P-587 (Schlein) and P-590 (Young).

This special presentation meeting will be open to all interested physicists. The new proposals will be considered at the summer meeting of the PAC in Aspen in June. A panel of PAC members will be in attendance at the special presentation meeting to make a preliminary evaluation of the new proposals. Questions regarding this special presentation meeting should be directed to T. Groves in the Director's Office.

OPERATIONS CENTER DEACTIVATED. . .

On Monday, April 3, the Operations Center at Fermilab was deactivated. The Center had provided liaison between personnel in the experimental areas and the accelerator main control room. With a reorganization, this responsibility for liaison is now being handled by Crew Chiefs in the experimental areas. To aid in resolving conflicts, two Duty Physicists are on call for four-week periods. Those presently serving are Gene Fisk and Tom Nash.

Detailed information about the status and progress of the experimental program is available from the Program Planning Office. Two Experiment Coordinators assigned there, Dave Burkhart and Ken Shafer, are available primarily weekdays to answer questions about the operations schedule or the status of the research program. All records regarding the use of the accelerator and experimental facilities are also being kept by the Program Planning Office.



The E356 Lab E neutrino detector under construction. Pictured in the right foreground is one of the 112-ton modules of the iron, scintillator, spark chamber target calorimeter. Following the six modules of target is the 750-ton iron toroidal muon spectrometer used in E379, E482, and E356 to identify muons. The barrels in the foreground and on top of the target contain liquid scintillator used in the eighty 10 ft × 10 ft counters.

(Photograph by Fermilab Photo Unit)