

RESEARCH ACTIVITIES DURING SEPTEMBER 1977

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The first 12 days of September were a maintenance and development period, with major work under way in both the accelerator and experimental areas. Accelerator startup went well, in spite of a feeder-cable failure and beam was available to experimenters within 24 hours of the scheduled time.

The Main Ring was started with a 200/300 GeV ramp, each with a 2-sec flattop. The 200-GeV front porch was dropped on September 21 because Dilepton #288, the prime user, was incapacitated by a magnet failure. Intensity was raised from 4×10^{12} protons/pulse at startup to 10^{13} protons/pulse as intensity needs increased. Only 0.78×10^{18} protons were accelerated in September, partly because of the short running period, but also because there was no high-intensity user.

Accelerator performance was outstanding in reliability. The accelerator delivered 312 hours, or 78% of the scheduled 397 hours for the month. This better-than-average performance is especially noteworthy following the longest and perhaps most ambitious accelerator-improvement shutdown to date.

Although there was beam present in the experimental areas an unprecedented number of hours per week, the program did not prosper commensurately. The number of hours for all experiments is typically about eight times the number of accelerator hours, but the corresponding factor for this month is four. Top priority was accorded to Dilepton #288, for which 200 hours of 200/300 GeV in Proton-Central had been requested for a

measurement of the energy dependence of the production of Υ states and the high-mass dimuon continuum. The experimenters were on schedule at startup after having undertaken the somewhat rushed installation of a "wedge magnet" (steel with a magnetizing winding) in place of some of the steel shielding between the two spectrometer arms. The first few days of data taking went well enough, but over the weekend spill seemed to deteriorate, especially with respect to rf structure on the 200-GeV spill, and the experimenters acquired only the data they would expect from 50 hours of good running. Just as it seemed the spill was returning to satisfactory quality on Monday, September 19, the analyzing magnet in the west spectrometer arm developed a coil-to-coil short and a major water leak. The Proton Department mechanical group under Ron Currier worked 10 long days in an effort to replace the damaged conductor without moving the magnet or coil. The sad end to this story is that the repair did not hold; within 24 hours it was found that there were two new turn-to-turn shorts in parts of the coil near the earlier repair. This disappointment did not represent the end of the story, because the same crew returned to the struggle with the added help of Jack Jagger and the magnet factory and in early October achieved at least temporary success.

The second intended beneficiary of 300-GeV running was Polarized Scattering #61 in the Meson Laboratory M1E line. Although they got off to a slower start than E-288, they achieved solid progress toward their goal of the measurement of 280 additional elastic scatters in the region of the cross-section dip near $t = -1.4 (\text{GeV}/c)^2$. The Meson Laboratory began

running two days after the Proton Laboratory because they had been involved in a major target-train change during the shutdown. Problems with tuning up the M1 line continued for several days and were compounded by software difficulties with the newly implemented experimental area PDP 11 systems. Once they were properly under way, however, and the operating mode remained fixed, the experimenters began to take data a great deal faster than in their previous running at 400 GeV. The 7.25-sec cycle, the intensity, and the good accelerator reliability combined to provide almost an order-of-magnitude improvement.

The Internal Target Area was active in September, but the Neutrino Area was off for all but the last few days because of the construction of an access and rail system for the main dump at the upstream end of Enclosure 400. The details of the running of individual experiments are indicated on the following "Monthly Operations History," which has a format similar to the weekly schedule, as a supplement to the tabulation of "Beam Utilization by Experiments" which has been included in earlier reports.
