

Fermilab accelerator operations summary for FY18 – Q2

1/1/2018 – 4/2/2018

Executive Summary:

During the reporting period beam was delivered to the NuMI target for NOvA, and MINERvA data taking. Beam was also delivered to Switchyard 120 to support a program of test beam experiments at the Fermilab Test Beam Facility (FTBF), to the BNB target for MicroBooNE data taking, and to the muon g-2 beamline and storage ring for commissioning.

During the quarter there were periods of scheduled and unscheduled downtime. During the full reporting period, 2.44×10^{20} protons were delivered on target for NuMI, 1.14×10^{20} protons were delivered on the BNB target. The Muon g-2 experiment began steady physics data taking toward the end of the reporting period, on March 22. During this period 1.17×10^{19} protons were delivered for the muon program.

More detailed information is available in presentations at the weekly All Experimenters' Meetings. See reports on the web at

http://www.fnal.gov/directorate/program_planning/all_experimenters_meetings/index.html

Status and Plans:

For the quarter, beam was delivered to the NuMI target primarily using Recycler slip-stacking. NuMI target power was consistently above 630 kW while operating the SY120 program. Beam delivery to the Booster Neutrino Beamline for MicroBooNE was stable, with minor interruptions near the end of the quarter for berm work.

G-2 made good progress on commission including achieving a PEMP Notable Outcome of 5000 muons per second. This was accomplished on January 12th, during the first attempt at running 16 pulses per super cycle. The 16-pulse mode revealed some timing issues that had to be worked out and the experiment had equipment issues requiring repairs. The 16-pulse mode operation was held off until the March 28th. After a successful multi-day test, g-2 began taking physics data on March 22.

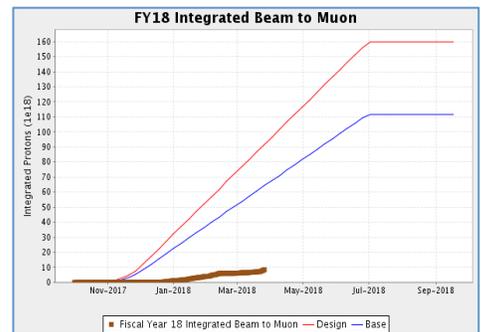
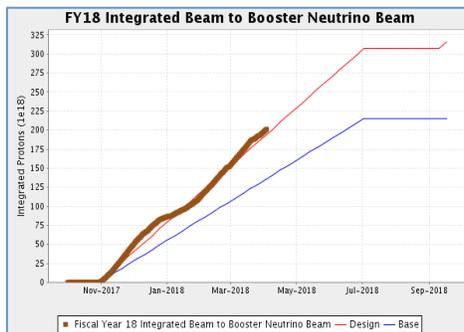
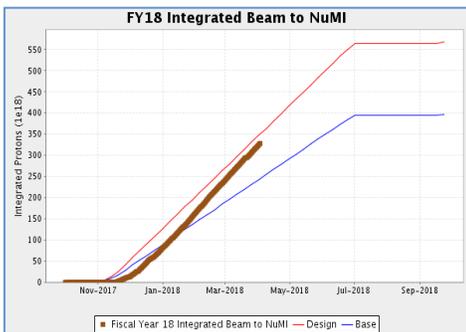
Following the installation and commissioning of the 750 keV laser notcher, in late January, the Booster achieved a PIP goal of 2.4×10^{17} protons per hour.

The notable events for the quarter:

- January 12, 2018: G-2 Notable Outcome - Store 5000 muons per second averaged over a super-cycle in Muon g-2 storage ring
- January 29 to February 5: Record week with 2.06×10^{19} protons on NuMI target
- March 30, 2018: Booster record 2.441×10^{17} protons per hour (PIP goal)

Performance

| | Metric | Achieved |
|---|---|---|
| Average protons on NuMI target per week | - | 1.88×10^{19} |
| Integrated POT for NuMI for period | 1.75×10^{20} | 2.44×10^{20} |
| FY18 integrated POT for NuMI to date | 2.74×10^{20} | 3.26×10^{20} |
| FY17a ctual NuMI uptime to date (hours) | - | 2950.4 |
| Percent Uptime (Recorded/Scheduled FY18) | - | 92.0% |
| Average protons on BNB target per week | - | 8.73×10^{18} |
| Integrated POT for BNB for period | 0.90×10^{20} | 1.13×10^{20} |
| FY18 integrated POT for BNB to date | 1.51×10^{20} | 2.00×10^{20} |
| FY18 actual BNB uptime to date (hours) | - | 3325.5 |
| Percent Uptime (Recorded/Scheduled FY18) | - | 92.0% |
| Average protons on Muon g-2 target per week | - | 9.00×10^{17} |
| Integrated POT for g-2 for period | 0.51×10^{20} | 1.17×10^{19} |
| FY18 integrated POT for g-2 to date | 0.76×10^{20} | 1.31×10^{19} |
| FY18 actual g-2 uptime to date (hours) | - | 1976.8 |
| Percent Uptime (Recorded/Scheduled FY18) | - | 52.5% |



Notes

- 1) "Metric" corresponds to the projected expected Protons-on-Target. The "Design" and "Base" profiles are respectively 125% and 87.5% of the "Metric" profile. The numbers quoted correspond to the proposed FY18 metric.
- 2) "Achieved" corresponds to the performance during the reporting period.

3) Percent uptime (actual/scheduled) since October 2017.