

Prospects for the Booster Neutrino Beam
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We are about to complete the second year of operating the Booster neutrino beam, delivering neutrinos to MiniBooNE. The steps taken to reduce and control lost protons has made it possible to increase the intensity of the beam, which is running typically 8×10^{16} protons per hour on target with no antiproton stacking, 7×10^{16} per hour with full stacking. The number of protons delivered per week has been typically 9×10^{18} for a full operating week, a factor of two better than one year ago.

With these recent improvements, we can consider seriously the prospects for doing physics with the Booster neutrino beam while operating the NuMI neutrino beam. The demands of antiproton production and NuMI operation will use most of the proton capacity of the Booster. With the proton rates now achieved from the Booster, we can see for the first time that there will be some additional protons available for the Booster neutrino line.

In FY 2005 and beyond, assuming modest further improvement, we can expect that the Booster can deliver about 10×10^{16} protons per hour within the constraint of keeping activity down to acceptable levels in the Booster tunnel. We expect that antiproton stacking (with slip stacking) and NuMI operation will require initially just over 6×10^{16} protons per hour. Allowing for uncertainties in these numbers, we expect to be able to deliver $2-6 \times 10^{18}$ protons per week to the MiniBooNE target. For FY 2006 and beyond, when NuMI is running throughout the year, this works out to about $1-2 \times 10^{20}$ protons on target per year.

With time and continued work, further improvements may increase the total proton production by the Booster. At the same time, other improvements may increase the rate that the NuMI beam can use protons. A year from now, after we have some experience operating the Booster for stacking, NuMI, and MiniBooNE operation, we will have better information and will refine this estimate. For now, we assume that the number of protons available for the Booster neutrino beam will be in the stated range in the foreseeable future. Collaborations proposing experiments to run in the Booster neutrino beam in FY 2006 and beyond should plan their physics program on the basis of $1-2 \times 10^{20}$ protons on target per year. Proponents may want to discuss what additional physics could be done with somewhat more protons, but they should understand that is beyond our present expectations for the beam.

With the funding situation for Fermilab that is expected in the next few years, the laboratory does not have a reserve of funds to build new experiments that are not yet proposed or approved. Operation of existing experiments or modest installation of completed apparatus can be contemplated. However, experiments should not be proposed for any beam line under the assumption that Fermilab will be able to provide very significant funding for new detector construction. Proponents of possible new experiments should discuss with the laboratory the prospects for external funding and what infrastructure the laboratory could provide.