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PROTON BEAM INTENSITY UPGRADES ON THE NEUTRINO TARGETS AT THE FERMILAB ACCELERATOR COMPLEX (15' + 5')

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Fermilab is committed to making a substantial increase in the average beam power delivered to the neutrino and muon programs via upgrades to the accelerator complex. Many of the upgrades to the existing injector accelerators are being carried out under the Proton Improvement Plan (PIP). Proton Improvement Plan –II proposes to build an 800 MeV superconducting LINAC, adding to the existing facility which has significant upgrade possibilities in future. In any case, the Fermilab Booster, an 8 GeV injector to the 120 GeV Main Injector, is going to play very significant role for nearly next two decades. In this context, very recently, we proposed and implemented a new beam injection scheme in operation called "early injection scheme" (EIS) for the Fermilab Booster that has a potential to increase the beam intensity from the Booster by at least 40% from current operation of 4.5E12 protons per Booster pulse (design intensity for the PIP). Here we present results from recent beam studies, current status of operational implementation and future plans for the EIS. The EIS operation and improvements should serve the Fermilab program well between the current PIP and future PIP-II upgrade at Fermilab.

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