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## Flattening the field during injection in the Fermilab booster using dipole corrector magnets

*Tuesday, 21 May 2024 16:00 (2 hours)*

The FNAL Booster is a fast cycling 15 Hz resonant circuit synchrotron accelerating proton beam from 400 MeV to 8 GeV. The linac pulse injected into the Booster is  $\sim 32 \mu\text{s}$  long and fills the ring by multi-turn charge-exchange injection. As part of the PIP-II project, the Booster injection energy and repetition rate will be increased to 800 MeV and 20 Hz respectively. Due to much reduced average current in the new superconducting PIP-II linac, the injection time will increase to  $550 \mu\text{s}$ . A shorter machine cycle coupled to a longer injection time make flattening the injection porch B-field during injection important requirement for successful PIP-II operation. We aim to achieve: (1) flattening of the net bending during injection using dipole correctors, and (2) using a new system based on an Altera FPGA board, reduction of the cycle-to-cycle bending field variation caused by current jitter in the Gradient Magnet Power Supply (GMPS). While the flat injection scheme is essential to future PIP-II operations, it should also noticeably improve efficiency for present HEP operations.

### Footnotes

### Funding Agency

### Paper preparation format

### Region represented

North America

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