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PIP-II Laserwire drive system commissioning

Thursday 5 June 2025 15:30 (2 hours)

Fermilab's PIP-II aims to advance H^- beam profiling to meet the stringent requirements of its 800 MeV superconducting RF linac. A gain-switched laser system has been identified as a promising alternative to enhance the transverse beam measurement capabilities of the laser-based diagnostic system. This study aims to assess the feasibility of this approach by evaluating the performance of the gain-switched laser system, including the average power, timing stability, temporal jitter, and extinction ratio of the produced laser pulses. Preliminary investigations were focused on characterizing the system's ability to deliver precise, consistent pulses with adjustable pulse widths. These capabilities are expected to improve the adaptability of the laser-wire diagnostic system to varying beam conditions. This work will provide insight into whether the gain-switched laser system can meet the requirements of non-invasive diagnostics in a high-intensity superconducting RF accelerator environment while also protecting the cavities of PIP-II.

Footnotes

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