

The Fermilab Facility for Dark Matter Discovery (F2D2): A Conceptual PIP-II Beam Stop Facility for Dark Sector Physics

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What do the accelerator target stations of the next decade look like? The NuMI beamline, fed by Fermilab's Main Injector, recently exceeded 1 MW beam power. Future experiments fed by the PIP-II superconducting linear accelerator might demand upwards of 2 MW in continuous-wave mode, compared the pulsed beams typical of neutrino experiments. Looking further into the future, the Muon Collider front end includes a target station with even higher power – 5 MW or beyond.

How do we build a 2+ MW target facility? How does a high-power, low-energy, CW beam affect target design compared to conventional high-energy neutrino targets? How do we manage radiation and heat? How is the facility serviced? What is the current state of capability, and what technologies do we need to develop? These questions are answered in the context of F2D2, a conceptual target station design for dark sector physics experiments using beam from PIP-II.

Working Group

WG 3: Accelerator Physics

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