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## Low-energy muon and muonium beam source at Fermilab

*Wednesday, 22 May 2024 16:00 (2 hours)*

We describe a high-efficiency source of muonium that can be transported as a beam in vacuum provides opportunities for fundamental muon and precision physics measurements such as sensitive searches for symmetry violation. Although PSI is currently the world leader, the intense 800-MeV PIP-II linac beam at Fermilab could provide world-class low-energy muon and muonium beams, with unparalleled intensity, driving the next generation of precision muon-based physics experiments at the intensity frontier. However, it is critical to initiate the prerequisite R&D now to prepare for the PIP-II era. A low-energy secondary muon line recently installed in an operating facility (the MeV Test Area, which utilizes the intense 400-MeV Fermilab Linac beam) could support the required R&D, and potentially compete for new physics in the immediate term, if approved. This beamline was developed for  $\mu^-$  and will need to be re-optimized for surface  $\mu^+$  production and transport, making it also suitable for muon spin rotation physics—a unique research and industrial application for which no U.S. facility exists, and whose facilities are oversubscribed worldwide.

### Footnotes

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