

The FRIB Project – Accelerator Challenges and Progresses

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The Facility for Rare Isotope Beams (FRIB), a new national user facility for nuclear science funded by the U.S. Department of Energy Office of Science and operated by Michigan State University (MSU), is currently being designed and established to provide intense beams of rare isotopes to enable scientists to make discoveries about the properties of these rare isotopes in order to better understand the physics of nuclei, nuclear astrophysics, fundamental interactions, and applications for society. The FRIB driver linac accelerates ions as heavy as ^{238}U to energies beyond 200 MeV/u at beam powers up to 400 kW. Machine maintainability requires an average uncontrolled beam loss below 1 W/m. Key R&D programs include low-beta cw superconducting (SRF) cryomodules and highly efficient charge stripping using liquid lithium film or helium gas. Challenges in vacuum systems may include prevention of surface contamination of SRF cavities, containment of helium gas using either plasma windows or differential pumping, and beam chamber coating to mitigate effects of gas desorption. This talk reports on FRIB accelerator design and developments with emphasis on technical challenges and progresses.

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