Building Cryomodules

The Facility for Rare Isotope Beams (FRIB) Laboratory at Michigan State University (MSU) has established a world-class program to design and produce superconducting radio frequency (SRF) resonators, cold masses, and cryomodules.

Experienced Staff

FRIB has experienced staff in place to deliver results reliably. FRIB has assembled and tested a total of 55 cold masses and 53 cryomodules. FRIB has also recruited established staff from laboratories across the world to build and operate the laboratory.

FRIB has developed, processed, and tested over 14 types of resonators, including single- and multi-cell elliptical resonators, large-grain and fine-grain quarter-wave resonators (QWRs), half-wave resonators (HWRs), electron gun, and injector cavities.

Delivering Results

The FRIB team is skilled at delivering products per stringent requirements and timelines.

FRIB designed and prototyped the SRF resonators to accelerate FRIB's heavy-ion beam that were then produced by industry. FRIB staff processed and tested 332 resonators of four different types and assembled them into 48 cold-mass strings of six different cryomodule types in approximately four years.

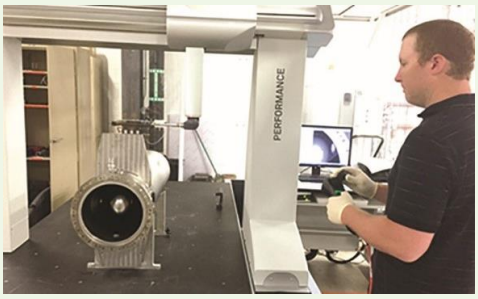
Innovative SRF Processing Facility

MSU built an integrated facility to support FRIB production, future upgrades, and accelerator projects.

The 2,500 square-meter SRF Highbay includes more than 373 square meters of class 100 clean room and chemistry facilities, automated cavity-etch tools, electropolishing facility, ultrapure water systems, component inspection area, and high-temperature vacuum furnace.

Skilled Trades Expertise

FRIB's comprehensive welding program focuses on projects that require American Society of Mechanical Engineers (ASME)-quality welding. FRIB cryomodules, cryogenic distribution and cryogenic-plant warm-gas piping, and target non-conventional



Learn more at frib.msu.edu

Michigan State University (MSU) operates the Facility for Rare Isotope Beams (FRIB) as a user facility for the U.S. Department of Energy Office of Science (DOE-SC), with financial support from and furthering the mission of the DOE-SC Office of Nuclear Physics.

utilities emphasizes both engineering as well as fabrication and installation documentation.

The laboratory also has a machine shop with four fully enclosed computer numerical control machine centers and one 4-axis horizontal machine center with rotary table.

Externally Registered Systems Meet International Standards

The FRIB Environmental Safety, Health and Quality Systems (ESHQ) management systems and supporting processes ensure compliance with international standards and FRIB Laboratory requirements.

FRIB is externally registered to international standards ISO 14001– Environment; ISO 45001 – Safety; ISO 9001 – Quality; and ISO 27001 – Information security. FRIB is audited annually by NSF International Strategic Registrations.

For More Information

Visit frib.msu.edu

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