

## **Facility for Rare Isotope Beams (FRIB) Background**

### **Basic description**

The Facility for Rare Isotope Beams is a proposed new \$550 million U.S. Department of Energy facility that will provide intense beams of rare isotopes – short-lived atomic nuclei not normally found on Earth – that will enable researchers to address leading-edge questions in nuclear structure and nuclear astrophysics. Such questions include: What is the origin of the elements we find in nature? Why do stars sometimes explode? How can we better model atomic nuclei and their interactions? What combinations of neutrons and protons can make an atomic nucleus? What are the new applications of isotopes that can better diagnose and cure disease?

The heart of the new facility will be a high-intensity heavy-ion linear accelerator that will provide world-unique technical abilities. These will include the ability to conduct experiments with fast, stopped and reaccelerated beams, which will help users extend the reach of nuclear science. FRIB will establish world leadership in rare-isotope science conducted in the United States.

### **Location**

The DOE selected Michigan State University as the site for the FRIB. Based on preliminary planning, the new facility was proposed to be built adjacent to NSCL's current facility located at South Shaw Lane and Bogue Street. A conceptual model offered by MSU proposes construction of the linear accelerator in a quarter-mile long tunnel under the campus.

### **Design and Construction**

MSU has been conducting analysis related to various FRIB technologies for several years. Conceptual design is anticipated to begin in FY 2009 and the facility will take approximately one decade to construct.

MSU will work with several prominent companies to build and implement the new facility, including the Washington division of San Francisco-based URS Corp. URS Corp. has a long track record of successfully managing technically complex programs and facility construction projects for the Department of Energy, other federal agencies, and the private sector.

Other companies that will be involved in the project include Harley Ellis Devereaux, an architecture and engineering firm based in Southfield, Mich., and NTH Consultants Ltd., a geotechnical and facilities engineering firm based in Detroit.

### **Facility Management**

NSCL Director and university distinguished professor Konrad Gelbke will serve as the FRIB director.

Other MSU leadership for FRIB will include:

- Project manager—current NSCL associate director for operations Thomas Glasmacher
- Chief scientist—current NSCL associate director for research Brad Sherrill
- Accelerator systems division director and technical director—current NSCL associate director for new initiatives Richard York
- Experimental systems division director—current MSU physics and astronomy professor Georg Bollen

Three longtime URS Washington Division employees also will serve as key project personnel for FRIB:

- Deputy project manager—Eric Gerber
- Environmental safety and health manager— Robert Lowrie

- Conventional facilities division director and chief engineer— Gary Coles

### **Safety**

MSU has an exemplary record regarding all aspects of safety, from new construction projects to daily operations. The university has a broad scope NRC license, recognizing deep capacity for radiation safety across the college. NSCL is registered compliant with the OHSAS 18001 standard for occupational health and safety and has logged 1,800 days without a lost work day due to injury. The university is committed to safe execution of all aspects of the FRIB project and will apply its many existing health, public safety, and environmental management resources to ensure success.

### **Funding**

Funding for the facility must be appropriated by Congress. Michigan's congressional delegation will play an important role in obtaining support for the appropriation. The selection of MSU as the site for FRIB is subject to the successful negotiation of a cooperative agreement between MSU and DOE and a National Environmental Policy Act review of the proposed site. The project is an important part of the nation's infrastructure, as important as highway construction. Maintaining leadership in science is critical to America's continued technological leadership in the world, which is vital to the nation's competitiveness.

### **Economic impact on Michigan**

This is a billion-dollar project for Michigan over the next decade, including:

- Estimated \$550 million in construction costs
- Creation of about 400 full-time jobs: about 180 jobs at FRIB and 220 jobs in related industries
- Increased business for local hospitality industry associated with attracting researchers from around the nation and world to MSU
- \$187 million in state tax revenue over 20-year period

### **Benefits for MSU students**

Today, approximately 100 MSU undergraduate and graduate students work at NSCL in a variety of capacities, from work-study employees to research associates. One of NSCL's strengths is the access it provides students at all levels post-secondary levels to cutting-edge tools of nuclear science, tools that are often not readily available to university students. There is every expectation that those opportunities for undergraduate and graduate students will be continued and enhanced when FRIB is operational.

### **Continued NSCL operations**

As FRIB progresses, NSCL will continue to provide users with leading-edge rare isotope research capabilities. MSU is currently investing in a significant upgrade to NSCL's experimental capabilities, including a low-energy linear accelerator for nuclear astrophysics experiments and a 10,000-square-foot expansion of the laboratory's experimental area. Slated for completion by summer 2010, the upgrade will enable researchers to conduct experiments with fast, stopped and reaccelerated beams of rare isotopes – three technical capabilities required for major advances in the field. These capabilities will be eventually be integrated with FRIB.

### **Additional information**

For more on this project, please visit the Department of Energy Office of Science Web site at [www.science.doe.gov](http://www.science.doe.gov).

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