On Dec. 11, 2008, the U.S. Department of Energy (DOE) announced that Michigan State University (MSU) in East Lansing, MI has been selected to design and establish the Facility for Rare Isotope Beams (FRIB), a cutting-edge research facility to advance understanding of rare nuclear isotopes and the evolution of the cosmos. The new facility—expected to take about a decade to design and build and to cost an estimated $550 million—will provide research opportunities for an international community of approximately 1000 university and laboratory scientists, postdoctoral associates, and graduate students.

MSU has proposed an FRIB that affords users opportunities with fast, stopped, and reaccelerated beams of rare isotopes and is proposed to adjoin the current NSCL facility as shown in Figure 1.

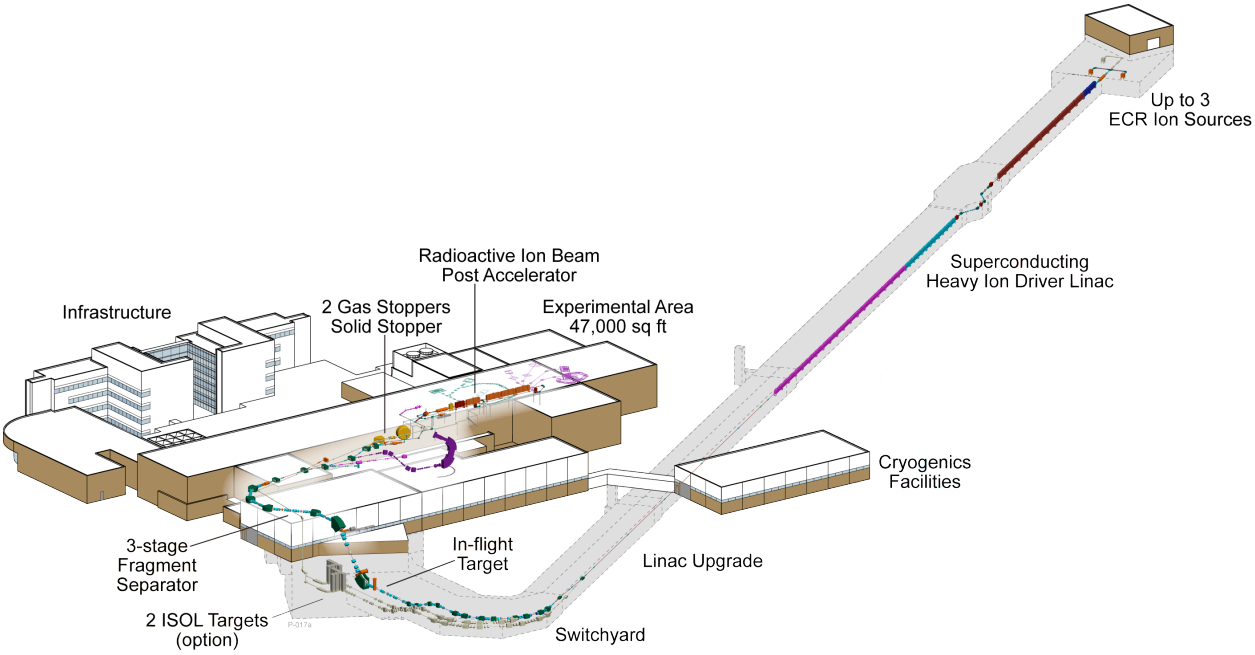

Figure 1: Proposed configuration of FRIB at MSU.

In preparing its application MSU made many choices but these choices are not final. After a Cooperative Agreement between DOE and MSU has been established, these choices will be reexamined in an alternatives analysis with opportunity for community input. The resulting Conceptual Design Report is subject to approval by DOE. Subsequently a base-lined design will be developed which is also subject to DOE approval.

The MSU application proposes

- Superconducting-RF driver linear accelerator that provides 400 kW for all beams with uranium accelerated to 200 MeV/nucleon and lighter ions with increasing energy (protons at 600 MeV/nucleon)
- Two ECR ion sources for redundancy with space to add a third ECR ion source
- Space in the linac tunnel and shielding in the production area to upgrade the driver linac energy to 400 MeV/u for uranium and 1 GeV for protons without significant interruption of the future science program
- Space to add multi-user capability
- One in-flight production target
- Space and infrastructure to add up to two ISOL targets or one additional in-flight production target with shielding to accommodate 1 GeV proton beams at 400 kW
- Three stopping stations (two gas stopping stations and one solid stopper)
- A superconducting-RF reaccelerator for reaccelerated beams up to 12 MeV/nucleon (uranium) and higher energies for lighter beams (e.g. 21 MeV/nucleon for ^{48}Cr)
- Experimental areas (47,000 sq ft) for stopped beams, reaccelerated beams, and fast beams (Figure 2)
- Upgrade options include doubling the size of the experimental area or adding a neutron scattering facility
- Allowance for experimental equipment
- Opportunity for a pre-FRIB science program using the existing in-flight separated beams from the Coupled Cyclotron Facility and the ReA3 reaccelerator. Users will be able to mount and test equipment and techniques with beams at all energies in-situ so that they are immediately ready for experiments when FRIB is complete. This will allow for a seamless science program during the time FRIB is under construction.
- User Relations Office during establishment of FRIB facility to support development of user programs and experimental equipment
- Venues for community input through an FRIB Users Organization (for individual users) and the Rare Isotope Research and Education Board (for institutions)
- Strong Governance through President's Project Advisory Committee (chaired by Ernie Moniz), Science Advisory Committee (chaired by Rick Casten), Project Management Oversight Group (chaired by Jim Yeck), Accelerator Systems Advisory Committee (chaired by Satoshi Ozaki) and Experimental Systems Advisory Committee (chaired by Jay Marx)

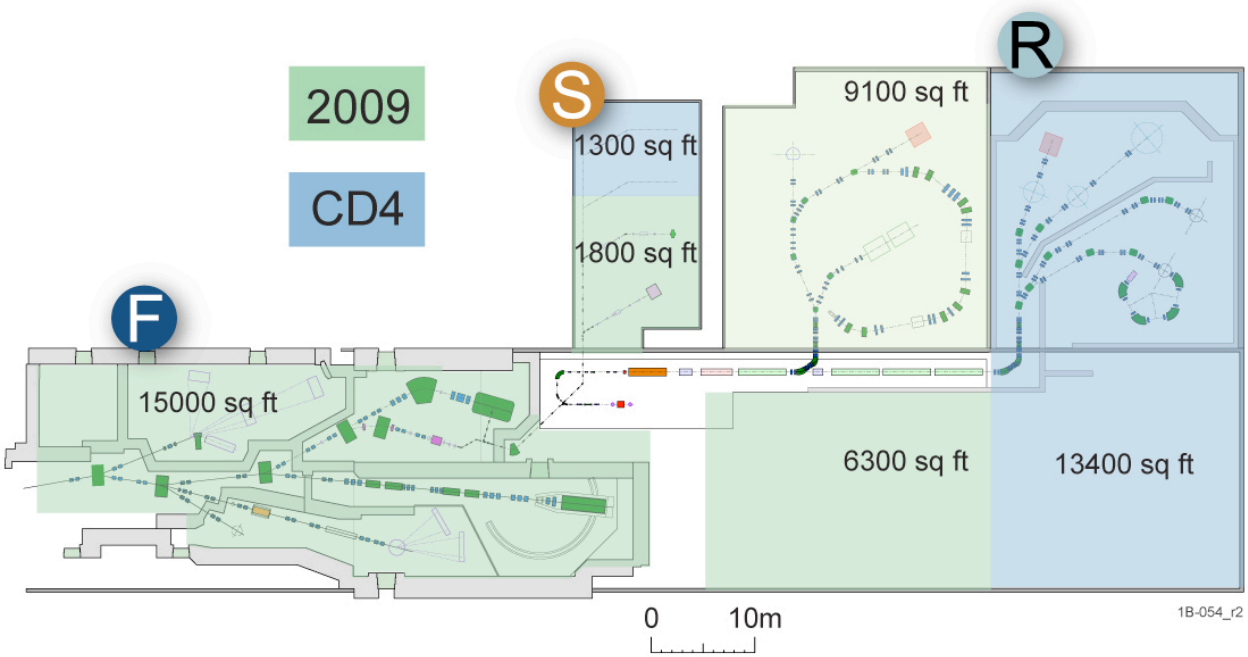

Figure 2: Proposed experimental area configuration of FRIB at MSU. F, S, R refer to Fast, Stopped, and Reaccelerated beam areas. The color code indicates the proposed completion time.

Links:

DOE announcement < http://www.sc.doe.gov/np/program/FRIB.html>

DOE Fact Sheet: Facility for Rare Isotope Beams Applicant Selection
< http://www.energy.gov/6795.htm>