

NSCL USER UPDATE

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U.S. Department of Energy Selects Michigan State University to design and establish Facility for Rare Isotope Beams

On Dec. 11, 2008, the U.S. Department of Energy (DOE) announced that Michigan State University (MSU) 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 1,000 university and national laboratory scientists, postdoctoral associates, and graduate students.

"The Department of Energy's new Facility for Rare Isotope Beams at Michigan State University promises to vastly expand our understanding of nuclear astrophysics and nuclear structure," said Acting Associate Director of the Office of Science for Nuclear Physics, Eugene Henry. "This capability will allow physicists to study the nuclear reactions that power stars and stellar explosions, explore the structure of the nuclei of atoms and the forces that bind them together, test current theories about the fundamental nature of matter, and play a role in developing new nuclear medicines and techniques."

The research conducted at FRIB will involve experimentation with intense beams of rare isotopes—short-lived nuclei not normally found on earth—and is expected to advance critical applications in the areas of materials science, medicine, and stockpile stewardship.

The proposals received in response to the May 20, 2008, Funding Opportunity Announcement (FOA) were subject to a merit review process conducted by a panel of world-renowned experts from universities, national laboratories, and federal agencies. The appraisal included rigorous evaluation

of the proposals based on the merit review criteria described in the FOA, presentations by the applicants, and visits by the merit review panel to each applicant's site.

Sources: DOE release (www.energy.gov/news/6794.htm) and fact sheet (www.energy.gov/news/6795.htm). For user-related questions about FRIB, contact Brad Sherrill, NSCL associate director for research and designated FRIB chief scientist at sherrill@nscl.msu.edu.

Work on new technical capabilities for NSCL users moves forward

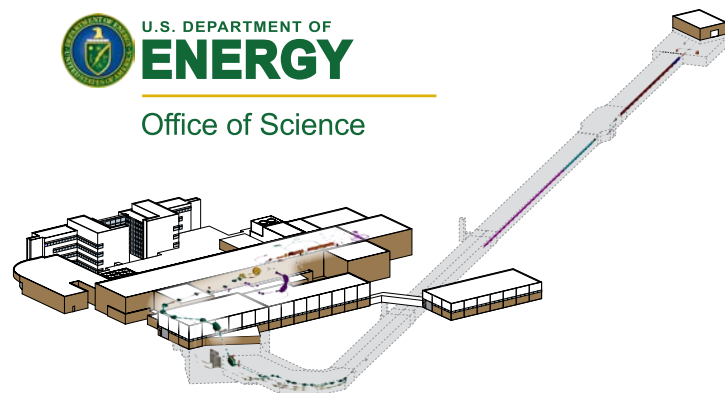
NSCL upgrade projects are making excellent progress. Despite the winter weather, including more than 20 inches of snow in December, construction continued on the new office wing and the new experimental area for research with stopped and reaccelerated rare isotope beams.

Among the construction milestones last fall: completing all steelwork for the experimental addition; tearing down one of the original wings of the NSCL building to make space for the new office addition; completing the office addition grade beams and underground utilities; and drilling the elevator shaft hole.

Work to erect the steel superstructure of the office addition started December 15 and is ongoing (see photo), as is masonry work on the experimental addition, which is scheduled to be enclosed in February.

Indoors, NSCL faculty and staff are making similar strides toward implementing new planned research capabilities related to the ReA3 project, expected to be commissioned in 2010. This upgrade of the NSCL user facilities was funded by Michigan State University and is expected to begin commissioning in early 2010. The upgrade includes a new linear accelerator and accompanying new 9,100-square-foot experimental area. ReA3 will provide the world's first capability to reaccelerate rare isotopes produced by in-flight fragmentation and fission. It will make available rare isotope beams of many elements that are currently unavailable due to the chemistry involved in usual rare isotope accelerated beam facilities. Among the exciting science opportunities this facility will open for users is the possibility to finally measure a remaining set of nuclear reaction rates necessary to accurately model nova nucleosynthesis and study how exotic nuclei with large neutron halos interact at large intranuclear distances.

The balcony that will hold ReA3 and the Electron Beam Ion Trap (EBIT) charge breeder is complete and ready for mounting of devices. And development continues on the various components to stop, transport, charge-breed, and



Drawing showing the MSU-proposed pre-conceptual design of FRIB adjoining the existing NSCL facility.

reaccelerate rare isotopes for research, most notably in nuclear astrophysics. These components include:

- the linear gas stopper (the momentum compression line to allow efficient capture of fragments is designed and magnets are under fabrication, while R-and-D continues on the optics of the cryogenic linear gas cell and the RF carpet)
- the low-energy beamline system from the gas stopper to the EBIT and also to the new stopped beam area (the optics design is done and the electrostatic beam transport elements are under construction)
- the EBIT charge breeder and Q/A separator (the electron gun and collector is built and will be tested soon, while the superconducting magnet is ordered and scheduled to arrive in May 2009)
- the LINAC (the RFQ has been ordered and is under construction, as are the cavities and solenoids for the three cryomodels, and also the rebuncher cryomodel; the cavity that will be used in the rebuncher module has been completed and tested)

A more complete version of this story appears on the NSCL Web site: www.nscl.msu.edu/ourlab/news/2008/under-construction.



Work to erect the steel superstructure of the office addition started December 15, 2008 and will continue into 2009

Archived video of re-accelerator webinar available

On Jan. 21, NSCL faculty members Georg Bollen, Marc Doleans, and Oliver Kester delivered a webinar about the ReA3 project to develop reaccelerated beams at the laboratory. The three described the ReA3 concept and overview, the expected beam rates and properties, the experimental areas, and the overall project status. Nearly 150 people from around the world participated in the webinar. The response was very positive and the community requested further such presentations.

An archived video of the webinar is available on the NSCL Web site, along with the presenters' slides and a log of questions and answers from the session: www.nscl.msu.edu/features/rea3-webinar.

Deadline approaching for beam time proposals

A reminder that proposals are currently being accepted until 5:00 p.m. (Eastern Time) on Feb. 26, 2009, for consideration at the 33rd meeting of the Program Advisory Committee on April 17–18, 2009. Written proposals will be evaluated by an external program advisory committee (PAC). NSCL does not require oral presentations during the PAC meeting.

Prospective users are encouraged to visit the NSCL Web site for a list of primary beams (www.nscl.msu.edu/exp/propexp/beamlist) and a Java applet (www.nscl.msu.edu/exp/propexp/yields) providing estimated rare isotope yields. For questions, including about preparing your proposal or bringing your own detector to NSCL, contact Raman Anantaraman, NSCL assistant director for user relations, at raman@nscl.msu.edu.

Upcoming conferences related to rare isotope science

Eighth International Conference on Radioactive Nuclear Beams (RNB8)

26–30 May 2009, Grand Rapids, Michigan
meetings.nscl.msu.edu/rnb8/
contact: rnb8@nscl.msu.edu

Third International Conference on Collective Motion in Nuclei Under Extreme Conditions (COMEX3)

2–5 June 2009, Mackinac Island, Michigan
meetings.nscl.msu.edu/COMEX3/
contact: comex3@nscl.msu.edu

National Nuclear Physics Summer School

28 June–10 July, East Lansing, Michigan
meetings.nscl.msu.edu/NNPSS09/
contact: nnpss@nscl.msu.edu

NSCL users in the news discussing FRIB

From a 19 December article in *Science*: Many scientists are just glad that the project, originally proposed in the late 1990s, is making progress. "We are happy that the decision has been made and that the excellent team at Michigan State has been chosen," says Witold Nazarewicz, a nuclear theorist at the University of Tennessee, Knoxville.

From an article in the January 2009 *Physics World*: "I'm so thrilled that a decision has been finally made," says Yale University physicist Rick Casten. "The community has been working for 19 years to get this."

The list of recent experiments is available at www.nscl.msu.edu/exp/. Please send comments on the NSCL User Update to Geoff Koch, koch@nscl.msu.edu.