LABORATORY UPDATE for ALUMNI

NSCL FRIB

March 2016

NSF conducts five-year operating-grant site visit for NSCL

In September 2015, NSCL submitted a proposal for renewal of the cooperative agreement between the National Science Foundation and Michigan State University to operate NSCL as a national user facility and for research funding for the local nuclear experimental and accelerator research groups. The proposal is to continue NSCL operations until FRIB is ready for connection into the existing beam lines. This will minimize the downtime of the user program and keep the transition period as short as possible, perhaps six to nine months. On 21-23 October 2015, the NSF conducted a site visit to review the proposed plans. The next major step is for the NSF Science Board to review the recommended funding level at its meeting in May 2016. The new grant period will begin in October 2016. A priority at NSCL is to operate for as many hours per year as possible for the user program; the amount will depend on the funding provided by the NSF.

ReA6-12 upgrade presents exciting science opportunities; whitepaper in progress

A group picture taken during the one-day ReA3 upgrade workshop held at MSU in August 2015.

In conjunction with the 2015 Low-Energy Community Meeting, a one-day workshop to discuss the ReA3 energy upgrade was held on 20 August on the campus of Michigan State University. A high-energy upgrade to ReA6 and eventually to ReA12 in the future is one of the flagship projects at the National Superconducting Cyclotron Laboratory and future Facility for Rare Isotope Beams. A timely construction of ReA12 was strongly endorsed in the 2014 Low-Energy Nuclear Physics Division of Nuclear Physics town meeting, and the longstanding interest of the community was again recognized by the large number of participants in the workshop. Following the opening and overview talks of the ReA facility, 14 speakers presented science opportunities that will open up with upgrades to ReA6-12.

The workshop kicked off the preparation for a whitepaper that will summarize exciting science opportunities for the energy upgrade up to 12 MeV/nucleon. Contributions to 16 different science cases have been received. They encompass a broad range of science at ReA6-12 covering nuclear structure and reactions, nuclear astrophysics and applications. Currently, a conceptual layout plan for the future ReA6-12 highbay is being developed to accommodate a diverse set of experimental equipment such as GRETINA (GRETA), the Active Target Time Projection Chamber (AT-TPC), a solenoidal spectrometer, the Isochronous Spectrometer with Large Acceptance at FRIB (ISLA), as well as a variety of complementary detection systems. The preparation of the whitepaper is in progress and completion is anticipated for spring 2016.

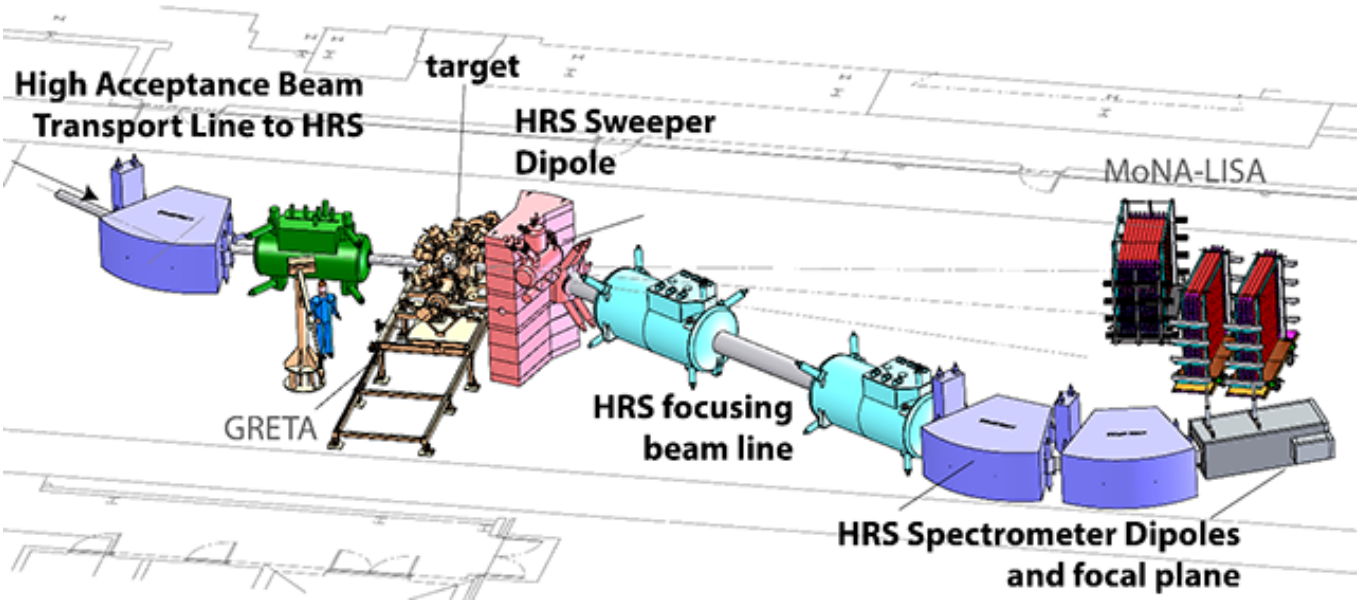
Annual Nuclear Physics DC Day held 14 March

In the past few years, it has become a tradition for members of the nuclear physics community to participate in Nuclear Physics DC Day, where they get the chance to visit with members of their congressional delegations and discuss the importance of nuclear science.

This year about 70 nuclear scientists from 26 states participated in the event, which took place on 14 March. More than 90 meetings were scheduled, equally distributed between staffers from representatives and senators. Overall, they met with 46 representatives and 47 senators from 26 states. The main “ask” was to support the President’s FY 2017 budget request for the U.S. Department of Energy Office of Science, particularly the $635.7 million requested for Nuclear Physics.

We received a lot of positive feedback from the meetings, and the staffers were in general very supportive of basic science research. These meetings are very important as they show the senators and representatives the direct impact that funding for basic science has on researchers and students from their states and districts.

High Rigidity Spectrometer will enable experiments at neutron-rich FRIB frontier



Above is the schematic layout of the High Rigidity Spectrometer, based on a first-order ion-optical design. Not shown in this layout is a high-rigidity, high-acceptance beamline that transports the rare isotopes from the FRIB fragment separator to the HRS with minimal losses, and the civil infrastructure to house the spectrometer. As examples of auxiliary devices that can be used in combination with the HRS, the shown layout includes GRETA and MoNA-LISA.

With the FRIB project reaching the 50-percent completion mark, users are very active in developing new devices and techniques for experiments at FRIB. The planning for the construction of a High Rigidity Spectrometer (HRS) has created a lot of excitement. This new spectrometer will be the flagship device for the fast-beam program at FRIB.

The most important characteristic of the HRS is the ability to bend nuclei produced at a magnetic rigidity for which their production rate through in-flight fragmentation is maximum (up to 8 Tm - the limits for the existing S800 Spectrograph and the sweeper magnet are 4 Tm). Operating at such high rigidities also allows for the use of thick reaction targets and limits the losses due to charge-state production. Gain factors in luminosity of factors of 10 or more can be achieved, with the largest gains for experiments with the most exotic neutron-rich species (e.g. a factor of 30 for the key nucleus of Calcium-60). The HRS will also greatly increase the scientific reach from other state-of-the-art and community-priority devices, such as the Gamma-Ray Energy Tracking Array (GRETA) and the Modular Neutron Array (MoNA-LISA), in addition to other ancillary detectors.

The importance of the HRS was highlighted in the 2015 Nuclear Science Advisory Committee's Long Range Plan to the U.S. National Science Foundation and the U.S. Department of Energy and marked as being essential for realizing the scientific reach of FRIB. As input for the Long Range Plan, a whitepaper with contributions from researchers from 21 U.S. institutions and additional institutions from abroad was drafted.

In the summer of 2015, detailed ion-optical and magnet feasibility studies were initiated with support from a grant from the Department of Energy, Office of Science for Nuclear Physics. The goal of these studies is to generate a realistic concept of the HRS that will enable the envisioned science program. The ion-optical studies are guided through evaluation of the performance of the HRS with respect to benchmark experiments. These studies aim to optimize the layout and to compare and weigh alternatives.

More information about the HRS can be found on the working group website.

FRIB civil construction continues 10 weeks ahead of schedule

A view of the FRIB construction site. Civil construction is 10 weeks ahead of schedule.

A view of the linac tunnel, one area where mechanical, electrical, and plumbing work is underway.

FRIB construction continues to move along 10 weeks ahead of schedule, with more than 200 tradespeople working on site.

Overhead mechanical, electrical, and plumbing work is underway on all levels of the linac-support building, as well as within the tunnel and lower subfloor in the target facility. Overhead cranes have been set in the front end. Exhaust fans and chillers have been installed on the upper second floor and lower second floor. Painting is progressing on the ground floor as well as the upper second floor. Cable-tray installation is 21-percent complete, with 8,736 feet having been placed thus far. Non-conventional utilities installation is 35-percent complete.

Additionally, temporary protection is ongoing to continue to heat more of the building during the cold winter months.

As for exterior progress, the support building is almost fully enclosed, with masonry and metal panel installation continuing on the south elevation. Structural steel erection is ongoing at the west end of the linac-support building.

Additionally, a self-supported concrete slab has been placed in the target area, and overall concrete placement is 82-percent complete, with 35,115 yards placed. Above ground level, construction continues on the hot cell wall and target wall. Target area backfill is nearing completion, with 73,763 tons placed.

'50 Years of Beam' program now online

Distinguished former laboratory employees present on their time at the Cyclotron Laboratory during the "50 Years of Beam" celebration. From left to right: Walt Benenson, Ed Kashy, Gary Crawley, Aaron Galonsky, Sam Austin, Hugh McManus, and Hugh's wife, Jean. (Photo courtesy of Michigan State University)

In October 2015, the FRIB Laboratory marked a significant anniversary in 2015—50 years since the first beam from the K50 cyclotron. A video of the morning program is now available on the NSCL YouTube channel.

The morning program included a presentation of “Up from Nothing: The Michigan State University Cyclotron Laboratory,” a book about the history of the Cyclotron Laboratory by Laboratory Director Emeritus Sam Austin; original compositions by MSU College of Music faculty and alumni; and memories from those who spearheaded the nuclear physics accomplishments at MSU. The program also included the premiere of the “MSU Beamlines: 50 Years of Excellence” video.

NSCL Director Brad Sherrill facilitates as master of ceremonies during the "50 Years of Beam" celebration. (Photo courtesy of Michigan State University)

Program elements available online

- The video of the "50 Years of Beam at MSU" program is online.
- The "MSU Beamlines: 50 Years of Excellence" video is online.
- "Up From Nothing: The Michigan State University Cyclotron Laboratory" by Sam Austin is available for purchase from MSU Press.
- View photos of the event on the "50 Years of Beam at MSU" gallery.

The composers' music is available online

- "Chart of the Nuclides" - Mark Sullivan
- "Separation Anxiety" - Benjamin R. Fuhrman
- "The Atomic Wait" - Matthew Schoendorff
- "Three Isotopes" - Mark Sullivan
- "Mind the Gaps" - Benjamin R. Fuhrman
- "Kaleisotope" - Matthew Schoendorff
- "Neutron Star" - Mark Sullivan

‘Isotopolis’ game released, allows players to explore scientific discoveries

Isotopolis allows players to guide particles to make new and rare isotopes.

The National Superconducting Cyclotron Laboratory teamed up with MSU's Games for Entertainment and Learning Lab in the College of Communication Arts and Sciences to create a new video game focused on discovering rare isotopes: Isotopolis.

Introduced at the laboratory's "50 Years of Beam" celebration last fall, the game is now available for free download on mobile devices and desktop computers by visiting the App Store and searching for "Isotopolis." The College of Communication Arts and Sciences also just released a YouTube video showcasing the game, featuring many of our lab employees.

In the game, players accelerate, steer, and collide particles to make new and rare isotopes as they learn about the fragmentation process and the table of nuclides. Isotopolis seeks to teach players about the world of particle physics through play.

The target audience of the game is those with a middle-school level knowledge of science. The goal of the game is to build knowledge related to nuclear science, provide understanding about the NSCL and its mission, and promote interest in STEM subjects.

To learn more about the game, visit the NSCL website.

Alumni spotlight: Joann Prisciandaro

Joann Prisciandaro

Joann Prisciandaro graduated from Michigan State University in 2001 after earning her PhD in chemical physics under Dr. Paul Mantica. Following graduation, she began working as a research fellow in the department of Radiation Oncology at the Mayo Clinic in Rochester, Minn.

During her time at the Mayo Clinic, she worked on a number of clinically relevant research projects funded by Varian Medical Systems. Additionally, she received clinical training as a therapeutic medical physicist. In October 2004, Joann joined the clinical faculty in the Department of Radiation Oncology at the University of Michigan. She completed her certification exams in Therapeutic Radiologic Physics in 2006 through the American Board of Radiology (ABR).

Although Joann is involved in a wide range of procedures and activities in the Department of Radiation Oncology, her main clinical and research focus is on brachytherapy, a procedure that involves the placement of sealed radioactive sources in close proximity to cancerous tissues. Joann leads the brachytherapy physics team in the department, working with four other medical physicists as well as radiation oncology physicians.

Joann Prisciandaro (far right), poses with her husband, Michael Claus (far left), and their son, Kadin (center).

Additionally, Joann has a strong interest in education. She teaches radiation oncology physics to radiation therapy technology students, graduate students in nuclear engineering and physics, radiation oncology residents, and clinical physics residents, and she is the director of the department's medical physics residency program.

Professionally, Joann is active in a number of American Association of Physicists in Medicine (AAPM) committees and subcommittees related to education and professionalism. She serves as the chair of the Work Group on Periodic Review of Medical Physics Residency Training and the Education and Training of Medical Physicists Committee, and she is a member of Education Council. She is also a board member and treasurer for the Commission on Accreditation of Medical Physics Educational Programs (CAMPEP).

Joann currently lives in Ann Arbor, Mich., with her husband, Michael Claus, professor and chair of chemistry at Adrian College (and also a Michigan State University alumn), and their six-year-old son, Kadin.

We want to hear from you

Send us your story ideas!

Contributors this issue

Like this issue's story about NSCL alumni Joann Prisciandaro, we want to feature at least one story each issue about you—our FRIB/NSCL alumni. Let us know what you are up to!

Email story tips about you and/or your fellow alumni to alumni@frib.msu.edu. Tell us about discoveries, business ventures, partnerships, awards, and other professional developments, and we may feature them in a future issue.

- Brad Bull
- Hiro Iwasaki
- Joann Prisciandaro
- Brad Sherrill
- Michael Thoennessen
- Remco Zegers

LOOKING AHEAD

16-17 March	Meeting of the FRIB Environmental, Safety, and Health Advisory Committee (ESHAC)
25-26 April	FRIB Earned Value Management System (EVMS) review
24-26 May	FRIB Accelerator Systems Advisory Committee (ASAC) meeting
1-3 June	FRIB Experimental Systems Advisory Committee (ESAC) meeting
28-30 June	DOE Office of Project Assessment Review of FRIB
24-29 July	Nuclear Structure 2016 Conference, Knoxville, TN
11-13 August	Low Energy Community Meeting in South Bend, IN
6-8 December	DOE Office of Project Assessment Review of FRIB (tentative)

The FRIB Laboratory Update for Alumni is published by the FRIB Laboratory and distributed via email. Please e-mail questions, comments, address changes, story tips, contributions, or requests to unsubscribe from this list to alumni@frib.msu.edu. If you are in touch with other NSCL/FRIB alumni, please forward this to them and invite them to contact us to subscribe.

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Michigan State University is establishing FRIB as a national user facility for the Office of Nuclear Physics in the U.S. Department of Energy Office of Science. Operation of NSCL as a national user facility is supported by the Experimental Nuclear Physics Program of the U.S. National Science Foundation.