

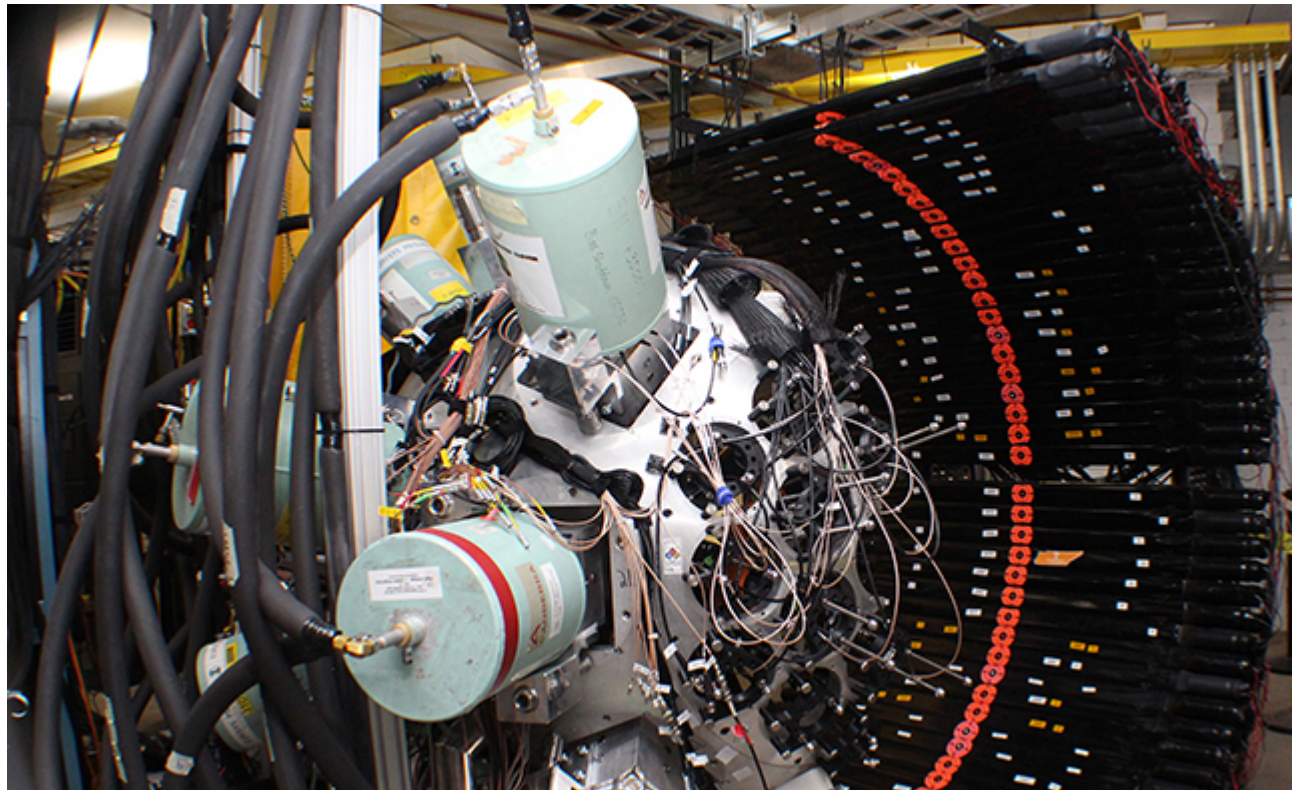


# LABORATORY UPDATE for USERS

Winter  
**2022**



We hope all of you are doing well as we close 2022. Let's pause to reflect on a year that included the completion of the FRIB Project, the start of FRIB user operation, and the submission of the 2023-2028 FRIB operating proposal to the DOE Office of Science. [Read more](#)



## Multi-institutional team publishes paper on first scientific experiment at FRIB

The first experimental result from FRIB was published in November in Physical Review Letters. Heather Crawford, a physicist at Lawrence Berkeley National Laboratory (Berkeley Lab) was the lead spokesperson for the first FRIB experiment. Multiple institutions collaborated on the first experiment, with researchers from Argonne National Laboratory, Berkeley Lab, Brookhaven National Laboratory, Florida State University, FRIB, Lawrence Livermore National Laboratory, Louisiana State University, Los Alamos National Laboratory, Mississippi State University, Oak Ridge National Laboratory, and the University of Tennessee Knoxville.

## Read more:

- [FRIB experiment pushes elements to the limit](#) (Lawrence Berkeley National Laboratory)
- [FRIB experiment pushes elements to the limit](#) (Brookhaven National Laboratory)
- [Twitter feed highlighting article and related information](#) (Oak Ridge National Laboratory)
- [It may be possible to cram more neutrons into atomic nuclei than previously thought](#) (Science)
- [Half-lives of rare isotopes revealed](#) (Chemical & Engineering News)
- [How long can exotic nuclei survive at the edge of stability?](#) (ScienceDaily)

## FRIB invites scientific users to submit non-proprietary research proposals for second Program Advisory Committee

FRIB issued its second call for proposals in October. With this call, FRIB invites proposals for beam time to be considered at the second [FRIB Program Advisory Committee's](#) (PAC2) meeting scheduled for 1-3 March 2023. Proposals for review by FRIB PAC2 need to be submitted by 11 p.m. EST on 23 January 2023. FRIB PAC2 will consider proposals for experiments using fast, stopped, and reaccelerated rare-isotope beams from the FRIB linear accelerator.

### [Read more](#)

Following the second call, an FRIB PAC2 Call for Proposals Webinar was held on 5 December. Presentation slides from FRIB Scientific Director Brad Sherrill can be found [here](#). Presentation slides from the FRIB Theory Alliance Director Daniel Phillips can be found [here](#).

## NEWS CENTER

**Long range plan update:** The Nuclear Science Advisory Committee (NSAC) Long Range Planning (LRP) process has begun in response to a [charge](#) issued by the U.S. Department of Energy and the National Science Foundation. To provide input to the LRP writing group, the nuclear science community got together in town hall meetings initiated by the Division of Nuclear Physics of the American Physical Society, with the ones on [Nuclear Structure, Reactions, and Astrophysics](#) and [Fundamental Symmetries, Neutrons, and Neutrinos](#) addressing the science opportunities enabled by FRIB. In addition to [resolutions](#), the output of a town hall meeting is a whitepaper each that summarizes the five to 10 year vision and past accomplishments of the community and that will inform the work of the NSAC LRP Writing Group.

**FRIB400 update:** The energy upgrade of the FRIB linear accelerator to 400 MeV/u for uranium (FRIB400) will double the reach of FRIB along the neutron dripline from Z=30 (zinc) to Z=60 (neodymium) into a region relevant for neutron-star crusts and to allow study of extreme, neutron-rich nuclei such as calcium-68. FRIB400 will expand the scientific impact of harvested isotopes by increasing the available yield of many isotopes by 10 times. The FRIB science community laid out the scientific opportunities in the [FRIB400 Whitepaper](#) that was subsequently endorsed at following Low Energy Community Meetings and

**Theory Alliance update:** FRIB-TA Director Daniel Phillips provides an update, including: Saori Pastore, one of the first faculty hired under the FRIB-TA Faculty Bridge Program, will become FRIB-TA director on 1 January 2023; several new members of the FRIB Theory Fellow and FRIB-TA Faculty Bridge programs joined FRIB-TA this year; and the FRIB-TA topical programs and summer school took place, with some hosting events in person this year. [Read more](#)

**Apply for the FRIB Visiting Scholar Program for Experimental Science 2023:** FRIB invites applications for the FRIB Visiting Scholar Program for Experimental Science 2023. The program was started to encourage and help junior researchers to establish a research program at FRIB. The award supports collaborations at FRIB for junior/non-tenured faculty or staff members. [Learn more](#)

**Low Energy Community Meeting focuses on realizing full scientific potential of national user facilities and reinforcing commitment to foster diverse scientific workforce:** Argonne National Laboratory hosted the 2022 Low Energy Community Meeting (LECM) 8-10 August. More than 300 members of the low-energy nuclear physics community attended the meeting, with 125 participating in person. [Read more](#)

**MIT team builds new laser spectroscopy system:** Ronald Fernando Garcia Ruiz, an assistant professor

most recently also as second resolution of the Nuclear Structure, Reactions, and Astrophysics Town Hall Meeting. Currently, selected sections of the whitepaper are being updated to prepare the document for submission to the NSAC Long Range Plan Writing Group.

**High Rigidity Spectrometer update:** The High Rigidity Spectrometer (HRS) project is underway and will significantly extend FRIB's scientific impact, enabling broad science programs with the furthest reach at FRIB. New federal funding from the Inflation Reduction Act for FY23 allows us to baseline the project and start long-lead procurements. The detailed design of HRS is currently ongoing. The HRS project has achieved mission need (CD-0) and alternative design selection and cost range (CD-1). The project goal is to achieve performance baseline (CD-2) in the next year.

at the Massachusetts Institute of Technology (MIT), and his team designed, fabricated, and installed a new laser spectroscopy system, the Resonant ionization Spectroscopy Experiments (RiSE), for use at FRIB. [Read more](#)

**Rohlfing event/video:** Joan Rohlfing, president and chief operating officer of the Nuclear Threat Initiative (NTI), gave a lecture titled "Pushing Nuclear Frontiers" on 6 October at the FRIB Laboratory. Rohlfing's lecture was part of MSU's Distinguished Nuclear Policy Lecture series. [Watch the video of Rohlfing's lecture.](#)

**FRIB's year in review:** For a video summary of the year's highlights, check out [FRIB's "A Year in Review: 2022" video.](#)

## CONGRATULATIONS TO OUR COMMUNITY MEMBERS

**MIT's Ronald Fernando Garcia Ruiz wins APS's 2022 Stuart Jay Freedman Award in Experimental Nuclear Physics:** Ronald Fernando Garcia Ruiz, an assistant professor at the Massachusetts Institute of Technology (MIT), was awarded the 2022 Stuart Jay Freedman Award in Experimental Nuclear Physics by the American Physical Society. [Read more](#)

**Colorado School of Mines's Kyle Leach awarded a grant by the Gordon and Betty Moore Foundation:** Kyle Leach, associate professor of physics at the Colorado School of Mines and visiting professor at FRIB, was awarded a grant by the Gordon and Betty Moore Foundation. [Read more](#) (Colorado School of Mines article)

**Members of FRIB user community named 2022 American Physical Society Fellows:** Seven members of the FRIB user community were named 2022 Fellows of the American Physical Society (APS): Daniel Bardayan (University of Notre Dame), Jose Crespo Lopez-Urrutia (Max Planck Institute for Nuclear Physics in Germany), Anna Frebel (Massachusetts Institute of Technology), Carla Fröhlich (North Carolina State University), Daniela Leitner (Lawrence Berkeley National Laboratory), Elizabeth Ricard-McCutchan (Brookhaven National Laboratory), and Andrew Steiner (University of Tennessee, Knoxville). [Read more](#)

## PUBLIC OUTREACH

**FRIB encourages scientific exploration through outreach programs:** FRIB's outreach programs this summer offered attendees the opportunity to explore the world of science. Elementary, middle-school, and high-school students, undergraduate college students, and science teachers participated in the activities. The programs are designed to excite attendees about nuclear science and to grow the nuclear science community as attendees progress in their educational paths.

This summer's outreach programs included:

- The Michigan State University (MSU) Department of Physics and Astronomy's Research Experiences for Undergraduates (REU) Summer Internship Program
- The MSU Gifted and Talented Education (GATE) Program's Gifted University for Parents and Precocious Youth (GUPPY) program
- MSU Extension's 4-H Exploration Days

- MSU GATE's Mathematics, Science, and Technology (MST) program
- FRIB's Physics of Atomic Nuclei (PAN) program
- FRIB's Physics of Atomic Nuclei Classroom Activities and Knowledge for Educators (PAN-CAKE) program
- FRIB's Physicists Inspiring the Next Generation: Exploring the Nuclear Matter (PING) program

Watch a video about [all of the summer outreach programs](#), and read more about [the Physics of Atomic Nuclei program](#).



**Physics and dance event introduces grade-school students to FRIB:** FRIB welcomed more than 1,000 attendees for a physics and dance event that included a performance and a variety of activities to explore dance and science on 3, 4, and 6 November. The performance and activities on 3 and 4 November were held for area schoolchildren, while the general public attended on 6 November. FRIB sponsored this event to attract non-science, technology, engineering, and math (STEM) students to FRIB to reach populations that don't normally identify with STEM. [Read more](#)

Read more:

- [Rare performance combines dance and physics](#) (WILX)
- [The science of dance: Performance combines physics, art after years of collaboration](#) (Lansing State Journal)

## IN THE NEWS

FRIB's work with chip testing and the liquid-lithium charge stripper received media attention. Below are some highlights from select outlets.

[Michigan State University launches Space Electronics Center with Texas Instruments](#) (DBusiness Magazine)

[Stripping ions with liquids](#) (Nature)

[Innovative liquid-lithium charge stripper boosts accelerator performance](#) (Phys.org)

For more FRIB "In the News" items, visit the [FRIB website](#)

# LOOKING AHEAD

- 5 January 2023** **Accelerator Readiness Review (ARR09):** Held prior to FRIB seeking authorization to operate with a primary beam power of up to 5 kW. As the beam power is increased from 3 kW to 5 kW, higher rare isotope beam rates are available.
- 17-18 January 2023** **Isotope Harvesting U.S. Department of Energy Review:** Assesses the progress of the isotope-harvesting equipment installation. The equipment will allow the collection of unused isotopes that can be used for applications and other experiments.
- 1-3 March 2023** **Second FRIB Program Advisory Committee (PAC2) meeting:** Reviews proposals submitted in response to FRIB's second call for proposals. The PAC will recommend which of the submitted proposals should get beam time.
- 25-30 June 2023** **2023 International Conference on RF Superconductivity:** Provides a forum for scientists, engineers, students, and industrial partners to present and discuss the latest developments in SRF science, technology, and applications.

For more upcoming FRIB events, visit the [FRIB website](#).

**THANK YOU TO OUR CONTRIBUTORS THIS ISSUE:** Kelly Chipps, Alexandra Gade, Daniel Phillips, Remco Zegers, Richard York

**IF YOU HAVE NEWS TO SHARE, PLEASE LET US KNOW!** Email [communications@frib.msu.edu](mailto:communications@frib.msu.edu)

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*Michigan State University operates FRIB as a user facility for the [U.S. Department of Energy Office of Science](#) (DOE-SC), supporting the mission of the DOE-SC [Office of Nuclear Physics](#).*