Facility for Rare Isotope Beams

Michigan State University, East Lansing, MI 48824

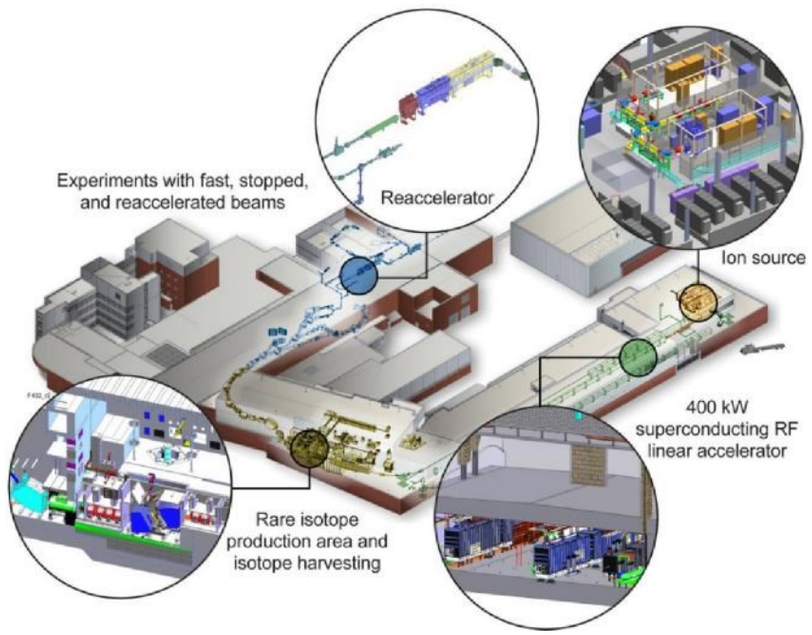
- **The Facility for Rare Isotope Beams (FRIB) will be the world's most powerful rare isotope accelerator (frib.msu.edu)**
  - It is designed to produce the widest range of isotopes for scientific research, including thousands of isotopes not yet observed on Earth.
  - Michigan State University (MSU) is establishing FRIB as a scientific user facility for the Office of Nuclear Physics in the U.S. Department of Energy Office of Science (DOE-SC).

- **What is a rare isotope?**
  - A rare isotope forms when neutrons are removed from or added to the nucleus of a stable atom and it becomes unstable against decay. Most rare isotopes are not normally found on Earth anymore.

- **FRIB science is of strategic importance for the United States**
  - Essential for maintaining leadership in fundamental nuclear science research; for understanding the existence of atomic nuclei, how elements were formed; and for understanding life cycles of stars.
  - Essential for developing new applications of rare isotopes in homeland security, non-proliferation, stockpile stewardship, medicine, biology, materials, energy, and environmental fields.

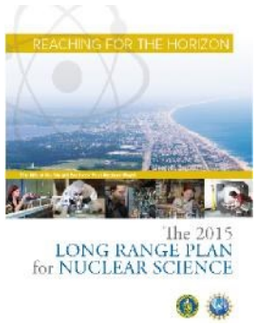
- **FRIB program complements and extends the stable-isotope programs at ARUNA labs and ANL ATLAS**
  - Coordinated approach provides a robust program and best value for scientific community

- **FRIB will be a DOE-SC facility established and operated by Michigan State University**
  - Civil and technical construction started in 2014, and the facility reached beneficial occupancy in March 2017.
  - FRIB completion is scheduled for 2022, but the project team is managing to early completion in fiscal year 2021.
  - Appropriation of baseline funding profile necessary to remain on cost and schedule.



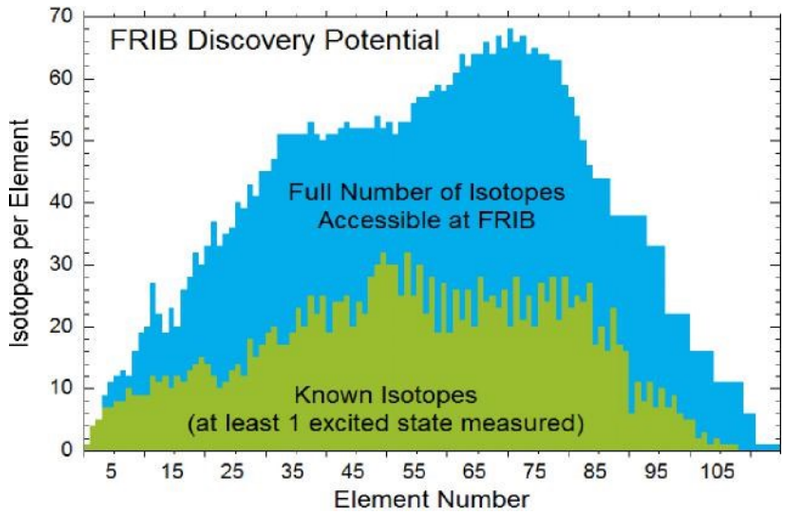
- **FRIB is cost-effective and being established under a Cooperative Agreement**
  - Baselined cost is $730 million of which MSU shares $94.5 million.
  - Additional MSU contributions of $300 million result in an FRIB Laboratory worth over $1 billion.
  - Designed to efficiently accommodate incremental science-driven upgrades.

- **FRIB is a high priority of the U.S. science community**
  - First recommendation in the 2012 National Academies Decadal Study of Nuclear Physics: *Nuclear Physics: Exploring the Heart of the Matter.*
  - Priority for completion in the 2015 Long Range Plan for Nuclear Science: *Implementing Reaching for the Horizon* by the DOE/NSF Nuclear Science Advisory Committee.
    "Expeditiously completing the Facility for Rare Isotope Beams (FRIB). construction is essential. Initiating its scientific program will revolutionize our understanding of nuclei and their role in the cosmos."



- **In addition to producing frontier science, as campus-based facilities, FRIB and ARUNA Labs will attract and train the next generation of nuclear scientists necessary for maintaining U.S. lead in science and technology**
  - University environment provides hand-on training and interaction of students with world-leading scientists on a daily basis.
  - FRIB Laboratory employs approximately 200 students throughout the year.
  - MSU, home to FRIB, is the nation's top-ranked nuclear physics graduate program.

- **Approximately 1,400 FRIB users include members from 38 U.S. states, 116 colleges and universities, 12 national laboratories, and 52 countries (fribusers.org)**



909

FRIB will more than double (represented in blue in graph above) our knowledge (green) of the properties of nuclei. In the coming decade, greater nuclear science accomplishments and benefits will come at a faster pace as new technologies in accelerators, experimental instrumentation, and computing will allow scientists to penetrate and explore the vast frontier of isotopes that in the past were inaccessible to human investigation.