



# **The Facility for Rare Isotope Beams - A DOE-SC Scientific User Facility Being Constructed with Financial Assistance**

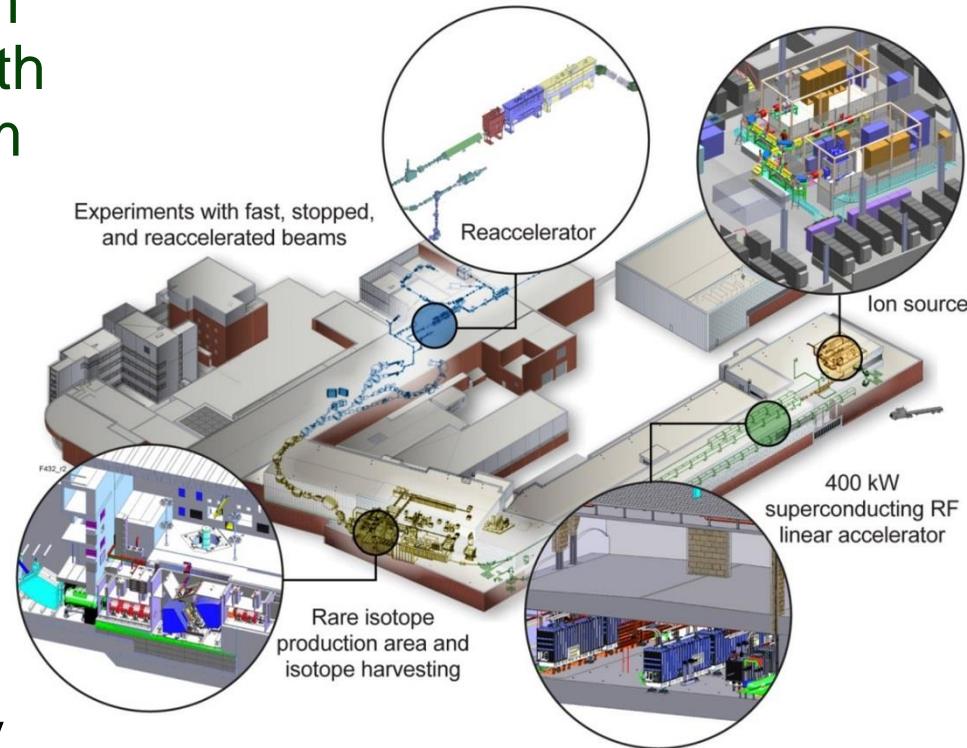
Presentation to the  
*Commission to Review the Effectiveness  
of the National Energy Laboratories*

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# Facility for Rare Isotope Beams (FRIB): A Future DOE-SC Scientific User Facility

- Funded with financial assistance from DOE Office of Science (DOE-SC) with cost share and contributions and from Michigan State University (MSU)
- Supporting mission of Office of Nuclear Physics (SC-26) in DOE-SC
- MSU selected after competitive announcement, which specified
  - Field Work Authorization for DOE FFRDC
  - Cooperative Agreement for other entity
- Total Project Cost \$730M
  - DOE share \$635.5M
  - MSU cost share \$94.5M
  - In addition to TPC MSU contributions \$212M

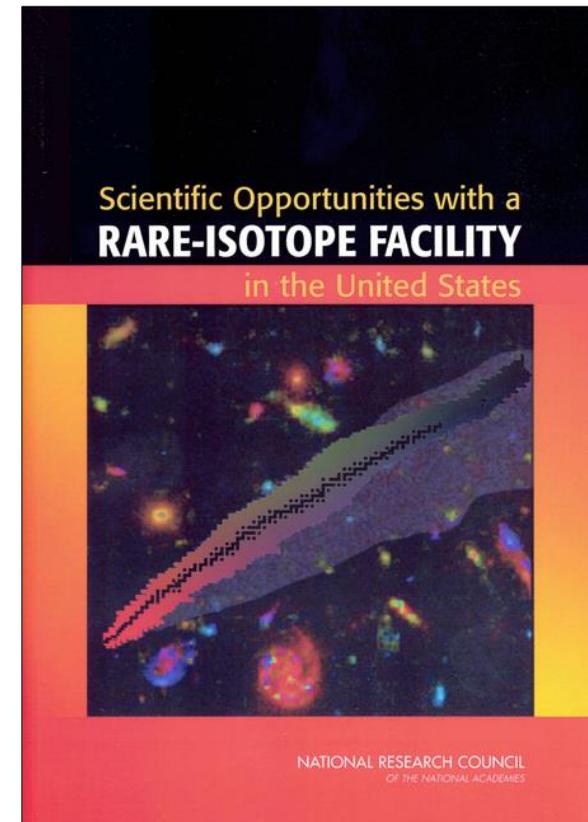
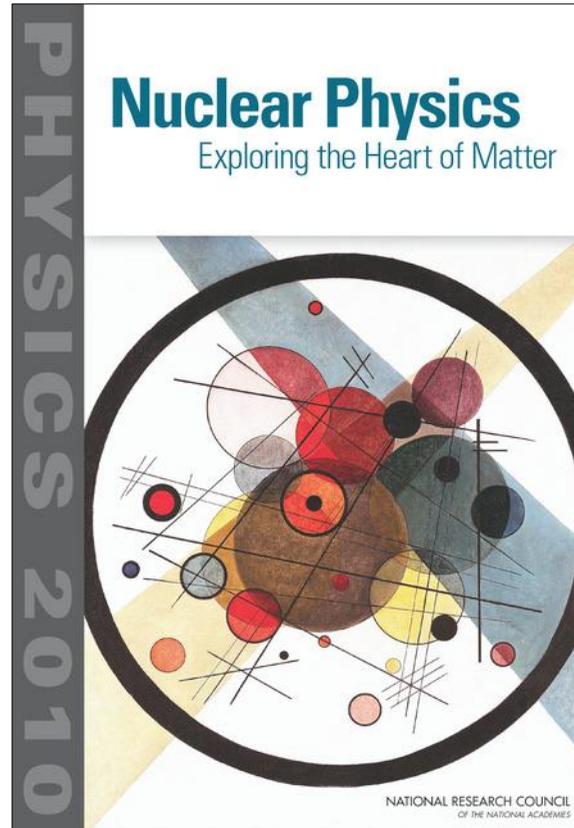


## ■ Key features

- 400 kW beam power for all ions ( $5 \times 10^{13}$   $^{238}\text{U/s}$ )
- Separation of isotopes in-flight
- Fast, stopped, reaccelerated beams

# FRIB Science Endorsed by National Research Council of the National Academies

- National Research Council Decadal Study on Nuclear Physics Report
  - Nuclear Physics: Exploring the Heart of Matter (2013)
- National Academies Rare Isotope Science Assessment Committee Report (RISAC)
  - Scientific Opportunities with a Rare-Isotope Facility in the United States (2007)



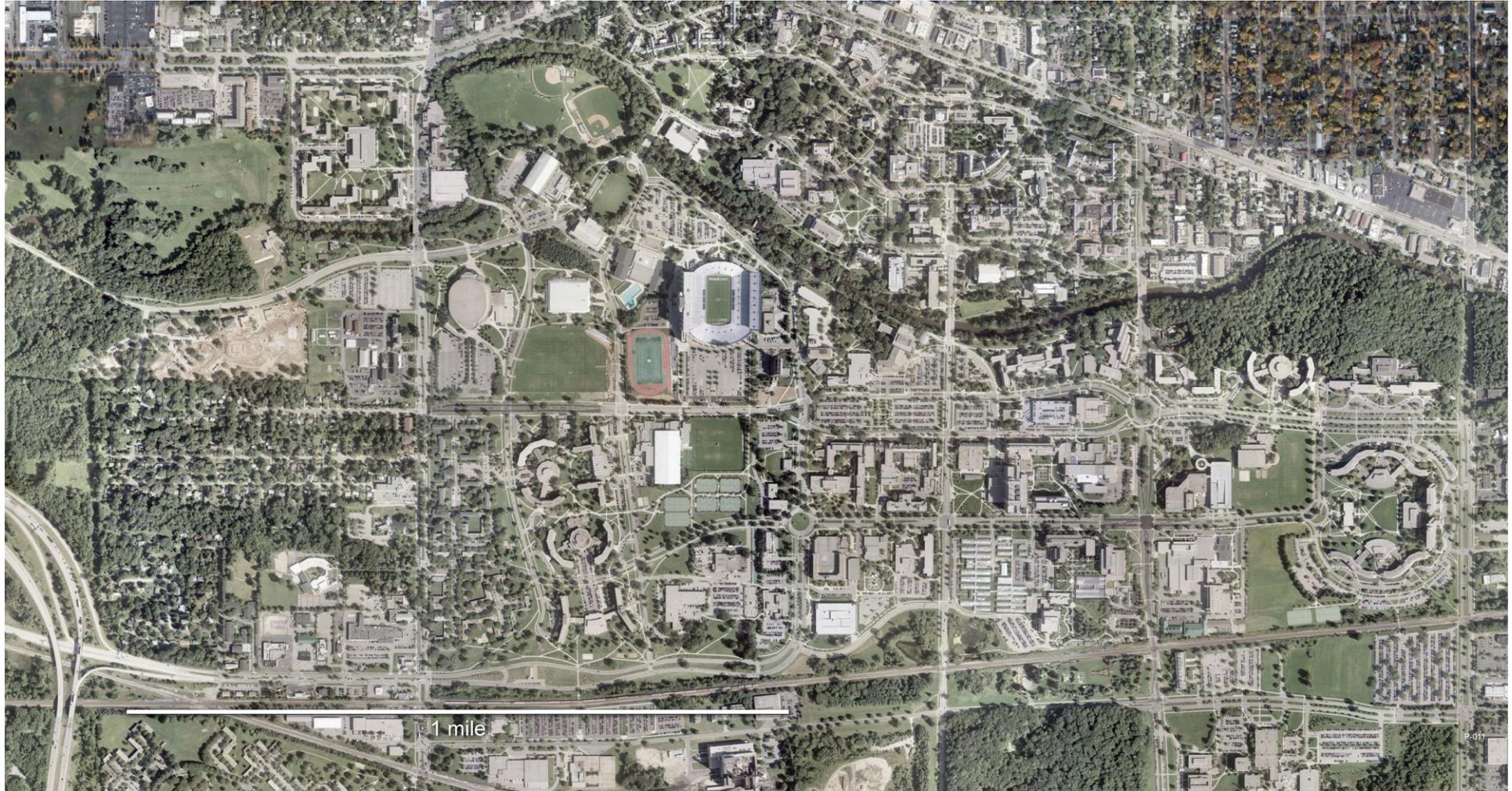
# FRIB is Under Construction



FRIB construction site on 23 October 2014 - web camera at [www.frib.msu.edu](http://www.frib.msu.edu)

# Michigan State University Context [1]

## MSU is the “Recipient” of DOE Financial Assistance



Public Research University established in 1855 | Elected Board of Trustees with authority delegated to President | 5,200 acres | 538 buildings | \$1.9B annual budget | 11,100 employees | 49,300 students

# Michigan State University Context [2]

## Committed Leadership and Reach Back Critical for FRIB

- MSU sees FRIB as enhancement to MSU brand, not money maker
- MSU President and Board of Trustees committed to FRIB success
  - MSU President interacts with DOE Acquisition Executive
  - FRIB Project Director has quick access to MSU President, reports to one of two MSU Executive Vice Presidents
- MSU has skin in the game (\$94M in cash plus \$212M in contributions)
- FRIB does not materially affect MSU business model
  - FRIB is ~5% of annual MSU revenue
  - FRIB can leverage MSU existing business model and existing relationships
    - » MSU does \$100M civil construction each year; FRIB civil \$170M over three years
  - FRIB can reach back into existing MSU entities for help (Labor relations, ESH, Physical Plant, General Counsel, Community Relations, Logistics, ...)
    - » FRIB has collocated, dedicated staff as needed (e.g. Procurement, HR, ESH, Construction)
    - » Designated staff in home unit otherwise (Lawyer, Contracting Officer, ...)
- MSU is familiar with Cooperative Agreements supporting user facilities
  - Operates National Superconducting Cyclotron Laboratory (NSCL) as NSF-funded national user facility under Cooperative Agreement since 1960's
  - Upon FRIB project completion, NSCL will cease to exist as national user facility

# Instruments to Disburse Government Funds

## ■ Contracts

- Government acquires goods or services for the direct benefit or use of the United States Government.
- Contractor must perform the work in full compliance with government technical and business requirements specified in the contract.

## ■ Financial Assistance

- Government supports a recipient to carry out a public purpose authorized by law.
- Recipient performs the work under its own procedures and the laws and regulations otherwise applicable to it.
- Government limits its involvement with the recipient to the minimum necessary to achieve program objectives.
- A Cooperative Agreement rather than a grant is used when it is anticipated that substantial involvement will be necessary between the government and the recipient as in the case of FRIB.

# Structure of FRIB Cooperative Agreement

- Financial Assistance: Grants
  - No substantial programmatic government involvement
- Financial Assistance: Cooperative Agreements
  - Substantial programmatic government involvement
- Structure of the FRIB Cooperative Agreement
  - Assistance Agreement
  - Budget Page
  - Special Terms and Conditions
    - » (10 CFR 600/605 for DOE) based on OMB guidance (2 CFR 215)
    - » E.g. reporting, publications, lobbying restrictions, intellectual property, buy American, trafficking in persons, ...
  - Additional Special Terms and Conditions
    - » Tailored to FRIB
    - » Contains Statement of Substantial Involvement
- The implementation of the FRIB Cooperative Agreement is a joint activity, a partnership with both parties clearly understanding their roles and responsibilities

# DOE Programmatic Needs Memorialized in Additional Special Terms and Conditions

1. DOE CONTRACTING OFFICER CONTACT INFORMATION
  2. ORDER OF PRECEDENCE
  3. DEFINITION OF FACILITY FOR RARE ISOTOPE BEAMS (FRIB)
  4. FUTURE USE OF FRIB AS A DOE NATIONAL USER FACILITY
  5. ADVANCE UNDERSTANDING REGARDING PAYMENT OF FEE FOR FRIB
  6. OTHER COMMITMENTS
  7. DOE REVIEW OF BUDGETS FOR SUCCEEDING BUDGET YEARS
  8. COST SHARING
  9. RESPONSIBILITY FOR DECONTAMINATION AND/OR DECOMMISSIONING (D&D) AND DEMOLITION AND DISPOSAL COSTS OR RESTORATION OF THE FRIB
  10. RELEASE AND WAIVER OF CLAIMS FOR DECONTAMINATION AND/OR DECOMMISSIONING (D&D) AND DEMOLITION AND DISPOSAL COSTS OR RESTORATION OF THE FRIB
  11. RESERVED
  12. PROJECT MANAGEMENT
  13. STATEMENT OF SUBSTANTIAL INVOLVEMENT
  14. RESERVED
  15. FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTER (FFRDC) ADVANCE UNDERSTANDING
  16. DESIGNATION OF ENVIRONMENT, SAFETY, AND HEALTH LEAD FOR THE FACILITY FOR RARE ISOTOPE BEAMS COMPLEX
- ATTACHMENT A “OTHER COMMITMENTS”

# FRIB Project Governance

- Cooperative Agreement between DOE-SC and MSU requires a Project Execution Plan (PEP)
  - PEP approved by DOE Acquisition Executive (SC-2) and concurred on by MSU President
  - PEP structure and content close to identical to other DOE-SC projects
    - » Mission, Project Description, Roles and Responsibilities
    - » Baseline, Baseline Change Control Process
    - » Management Systems (includes EVMS per ANSI 748)
    - » Transition to Operations
  - PEP defines *Joint Project Team* (analogous to *Integrated Project Team*)
    - » DOE
      - FPD, Co-Chairperson
      - DOE-HQ NP Program Manager
      - Deputy FPD
    - » MSU
      - Project Manager, Co-Chairperson
      - Associate Project Manager

# Cooperative Agreements Need to be Tailored for Construction Projects

- Grants anticipate almost no interaction between the Government and the recipient during performance. Cooperative agreements are used because substantial government involvement with the recipient is necessary.
- Complex Construction Projects have unique features that must be accommodated in the CA
  - Contingency not foreseen in Financial Assistance
    - » Government needs to assess fair and reasonable cost
  - Performance periods longer than normal
  - Standard budget sheets are not sufficient
    - » Submit spreadsheets by email rather than through Grants.gov
- All these issues can be worked out with shared commitment. Needs experienced managers and close working relationship between
  - » DOE Program Office
  - » Federal Project Director and DOE Integrated Support Center
    - Contracting Officer, Legal, Financial Analysis
  - » Recipient's Project Director and Recipient's Sponsored Research Office
    - Contracting Officer, Dedicated contract specialist

# Delivering Project for DOE with External Regulators

- DOE needs assurance that Recipient remains in good standing with external regulators so that mission is not compromised
  - FRIB reports all MSU regulations issues to DOE FPD to keep trust
- DOE needs assurance that external regulators provide reasonable requirements so that mission is not compromised
  - Worker Safety: 10 CFR 851 vs. Michigan OSHA
  - Nuclear Safety: 10 CFR 830 vs. 10 CFR 20 (NRC)
  - Much of the CFR language identical, we wrote cross walks
- External regulators with limited experience – Recipient needs to compensate with experts
  - Nuclear Regulatory Commission regulates exposure to humans and radioactive material leaving accelerator
    - » NRC requires radiation safety committee and reviews Radiation Safety Officer qualifications
  - State of Michigan regulates accelerator
    - » Hold our own Accelerator Readiness Review, report to MSU President's Office

# External Regulations

- External regulations not designed for DOE projects
- External regulations not always integrated with each other
  - Overlaps and holes
  - Recipient needs to work this out and decide on approach and document. Local regulators will not be able to provide definitive interpretation, they may share their practice
- Requirements-based management pays off
  - Investigate applicability of purported regulations, document decision and rationale
- External regulation may be quiet on certain important issues, recipient needs to mitigate this. FRIB uses DOE Orders for reference as they provide integrated sets of requirements.
  - Integrated Safety Management (DOE O 450.2), Quality (DOE O 414), Environmental Management (DOE O 450.1)
    - » Incorporate into registered OHSAS 18001, ISO 9001, ISO 14001 programs and have audited by external registrars
  - Natural phenomena hazards (DOE O 420.1C) for accelerators

# Need to Manage Constructive Relationship with Multiple Regulators

- Functioning relationships with external regulators are key to project success
  - For the regulator, DOE mission is only a part of the Recipient's endeavor. Relationship with regulator can be adversely affected by all endeavors.
- Leverage functioning, well-established relationships, e.g.
  - Police – FBI (export control), DHS (infrastructure safety)
  - EHS – EPA (air emissions, water), NRC (rad exposure), MI-OSHA, DOT (rad transport)
  - Physical Plant – City (drinking water), State (elevators), Fire Marshal
  - Community Relations – City (load limits on roads), NEPA
    - » MSU's relationship with community are very good. We leveraged this to support NEPA compliance.
- Manage risk that external regulators may overstep their authority
  - Advice versus direction
  - Invoke disambiguation process for federal agencies

# Must Meet Expectations of All Stakeholders

- DOE
  - Has established project delivery approval sequence (CD-1, 2, 3, 4)
  - Has oversight expectations (Office of Project Assessment)
- Recipient's governing body (elected Board of Trustees for MSU)
  - Has established civil construction delivery approval sequence (Step 1, 2, 3)
  - Has oversight expectations (Vice Presidents and President)
- Congressional appropriations professional staff have project delivery expectations (manage through DOE Acquisition Executive)  
FRIB, under financial assistance
  - Is now a congressional line item
  - Followed “no new construction starts” under Continuing Resolution
  - Follows intent of DOE O 413.3 (which does not apply to financial assistance)
- Financial Assistance Regulations
  - Office of Management and Budget
    - » Issues Circulars to standardize Financial Assistance Practices
      - 2 CFR 200 (super circular, just over 100 pages) effective 26 Dec 2014
  - Awarding agencies implement Circulars in their regulations

# Financial Assistance Provides Opportunities to Enhance Project Success

- Obligate funds, at recipient's risk, for which Budget Authority has not yet been received
  - “Pre-award spending”
  - Proceed in success-oriented manner (e.g. during Continuing Appropriations Resolution)
- Recipient is engaged and may have significant skin-in-game and enhances value to government
  - Cost share
  - Contributions
- Recipient can backstop third-party commitments by making them second-party commitments, which are easier to manage for DOE
- Recipient is responsible for decontamination and demolition
  - Reduces future cost for government

# Projects can be Successful under Contracts and through Financial Assistance

- **Contracts give government more control and more responsibility**
  - Objective is to acquire an asset (scope is important)
  - More responsibility for government means more risk and cost to government
- **Financial Assistance can provide enhanced efficiency**
  - Objective is to support a public purpose, e.g. provide research opportunities
  - Recipient's infrastructure can be leveraged
  - Government oversight can focus on outcomes rather than process and means and methods (since government is not at risk)
- **Responsive recipient and good management are key to financial assistance success, leading indicators for success include**
  - Recipient with significant commitment (personal and institutional)
  - Personally committed, emotionally engaged senior leadership (success is personal priority for leadership)
  - Recipient has valuable brand independent of financial assistance agreement
  - Access to highly-qualified personnel