



# Potential MSU Contribution

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On Behalf of FRIB, MSU

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**MICHIGAN STATE**  
**UNIVERSITY**

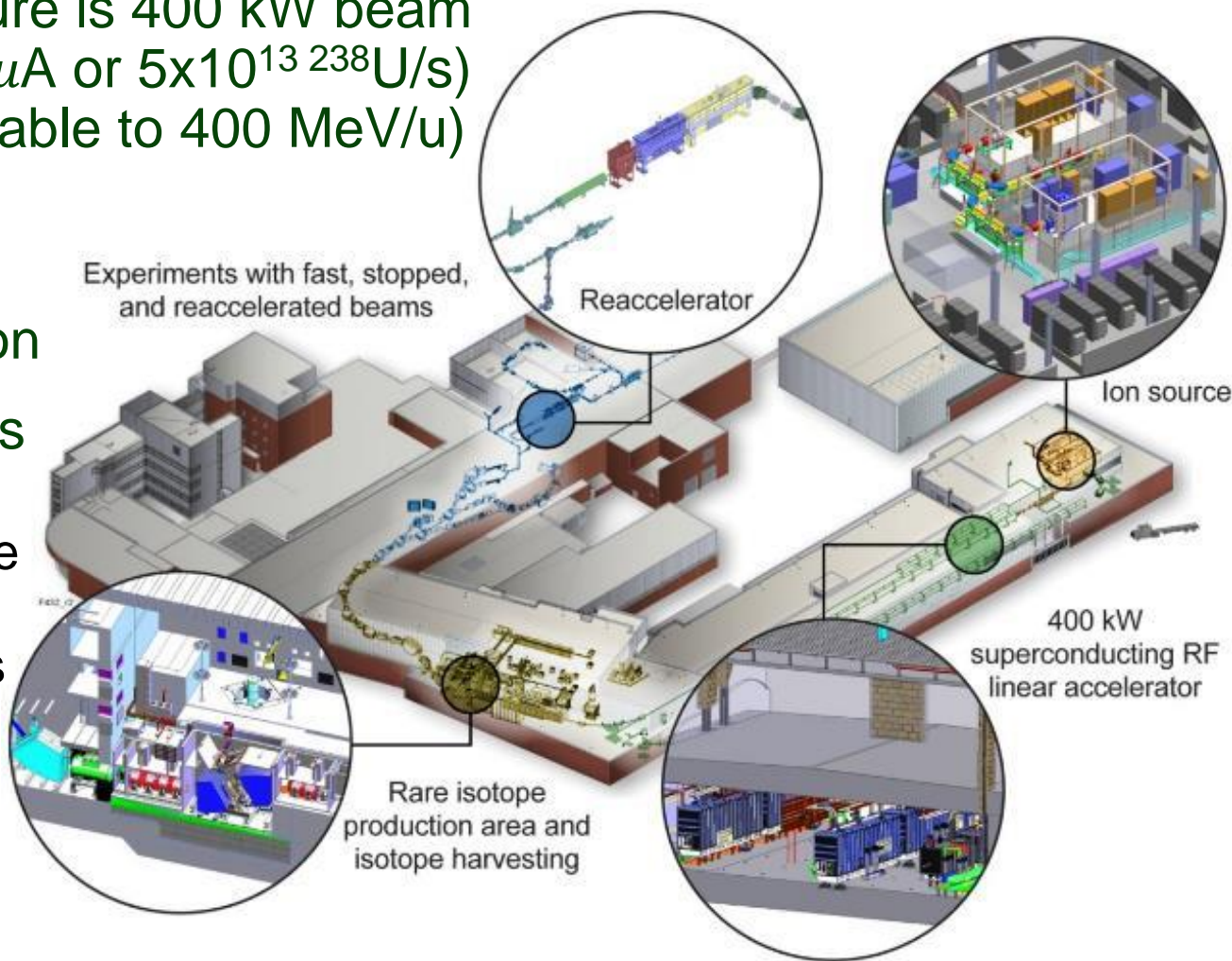


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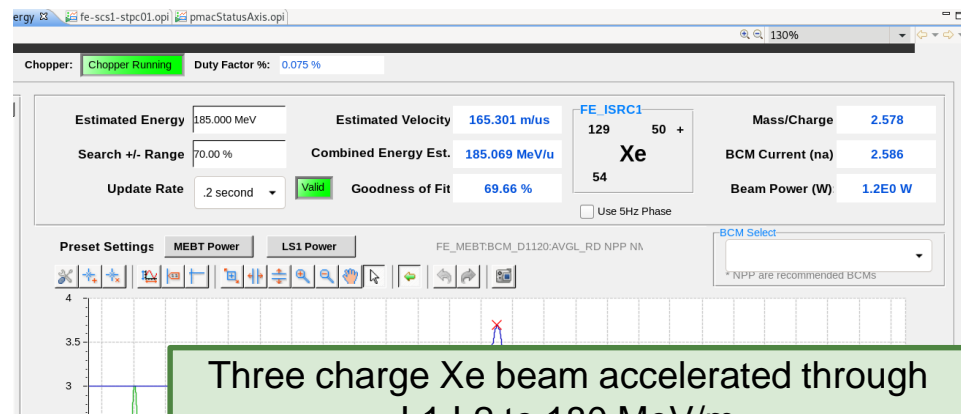
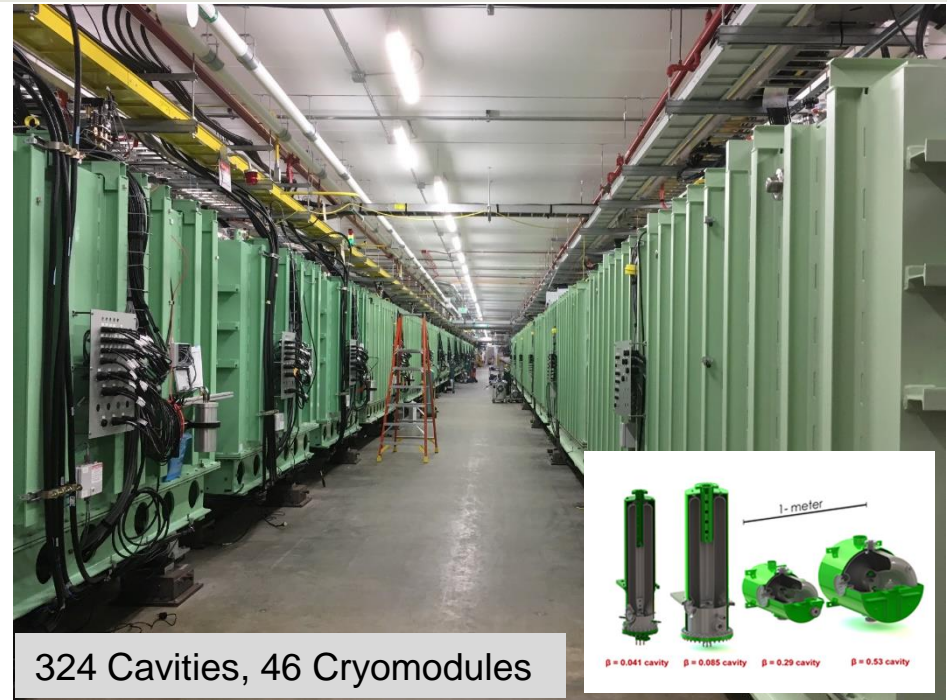
# FRIB: CW Heavy Ion Linac + Reaccelerator with Fast, Stopped and Reaccelerated Rare Isotope Beams

- Driver Linac key feature is 400 kW beam power for all ions ( $8\text{p}\mu\text{A}$  or  $5 \times 10^{13} \text{ }^{238}\text{U/s}$ )  $> 200 \text{ MeV/u}$  (upgradable to  $400 \text{ MeV/u}$ )
- High-power target of rotating graphite for rare isotope production
- Separation of isotopes in-flight provides
  - Fast development time for any isotope
  - Beams of all elements and short half-lives
  - Fast, stopped, and reaccelerated beams



# Strong SRF Team Delivered World's Highest Energy CW Hadron Linac

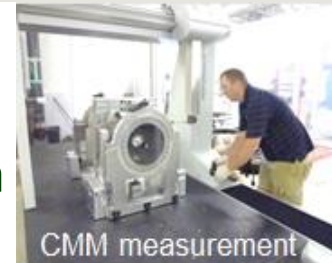
- Extensive experience with cavity, FPC and tuner design, prototype and production.
- Superconducting design team delivered FRIB unique bottom up cryomodule design.
- Processing and assembly team are experienced and capable to do SRF related R&D and production work.



Three charge Xe beam accelerated through L1,L2 to 180 MeV/m

# Full SRF Infrastructure at MSU for FRIB Construction & SRF Research

- 2014 MSU invested a brand new SRF infrastructure to support FRIB and SRF research
- 2015 SRF infrastructure in full operation with high availability and high throughput
  - More than 500 cavity testing conducted
  - 49 cavity strings and modules assembled
  - Peak rate, 1 cavity test per day, 3 cold mass per month, 2 module per month.
- Full infrastructure allow MSU to perform all cryomodule work in-house



# FRIB Quality Management System

- Processes & systems established to successfully deliver Project scope
  - FRIB Quality Plan certified according to ISO9001 standard
  - Annual internal & external audits to assess effectiveness
- The FRIB Laboratory is certified to:
  - ISO 9001 Quality Management System
  - ISO14001 Environmental Management System
  - ISO 45001 Occupational Health and Safety Management System
  - ISO 27001 Information Security Management System



# Potential MSU Contribution to ILC

- FRIB SRF team just roll off large production and capable engage large SRF project.
- Infrastructure is available and support ILC work
- FRIB take on portion of cryomodule work is feasible

