

# Some history on FRIB and us

- Late November 2022, visiting WMU and MSU
  - Discussions with EoS group: build up a (long-term, including FRIB400) collaboration on EoS topics with radioactive beams at  $E/A > 100$  MeV (and maybe even below...)
  - Meeting with directors (T. Glasmacher, G. Bollen, B. Sherrill): strong interest in reinforcing physics case; availability to use US resources
- December 2022 and January 2023
  - Started discussions within the FAZIA collaboration
  - News about the FRIB-IN2P3 agreement (Betty)
  - Signature of White Paper US LRP document at NSAC for EoS with heavy-ion collisions at FRIB

# History of ideas on FRIB projects

- Proposal 23058 by K. Brown et al. @ PAC3 - FRIB
  - signed by a number of FAZIAns in Italy and France (G. Verde, T. Marchi, I. Lombardo, D. Dell'Aquila, A. Chbihi, D. Gruyer, C. Ciampi, J.-E. Ducret, Q. Fable)
  - Approved in February 2023
- February 2022
  - FAZIA collaborations meeting with talk by Zbigniew from WMU
- April 2022
  - Institution of a FAZIA Panel for FRIB perspectives inside the FAZIA collaboration

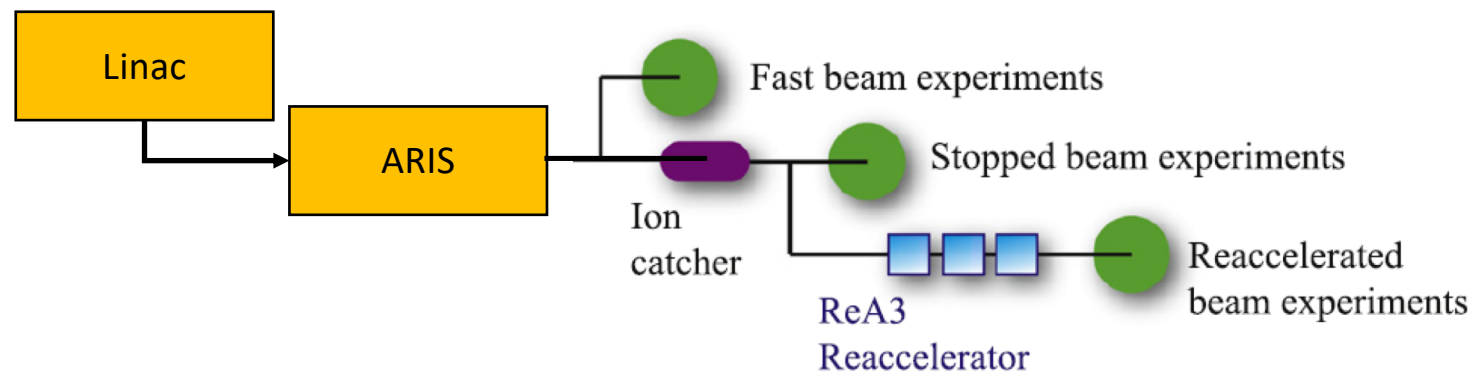
# FAZIA panel and plans

- Panel (see Giovanni's presentation)
  - ✓ G. Casini, G. Verde (Italy), D. Gruyer, N. Le Neindre (France), Byungsik Hong (S. Korea)
  - ✓ Mostly brain storming and preparation of FAZIA Days (today)
  - ✓ New detectors or modifications of existing ones?
  - ✓ Coupling to already existing and operating detectors at FRIB (HiRA, LANA, ...)
- Other informal discussions (Giuseppe, Simone, Diego, Kyle Brown)
- Some exchanges (G.V.) with Department of Energy contacts (mostly discussing possible INFN policies)

# Where are we?

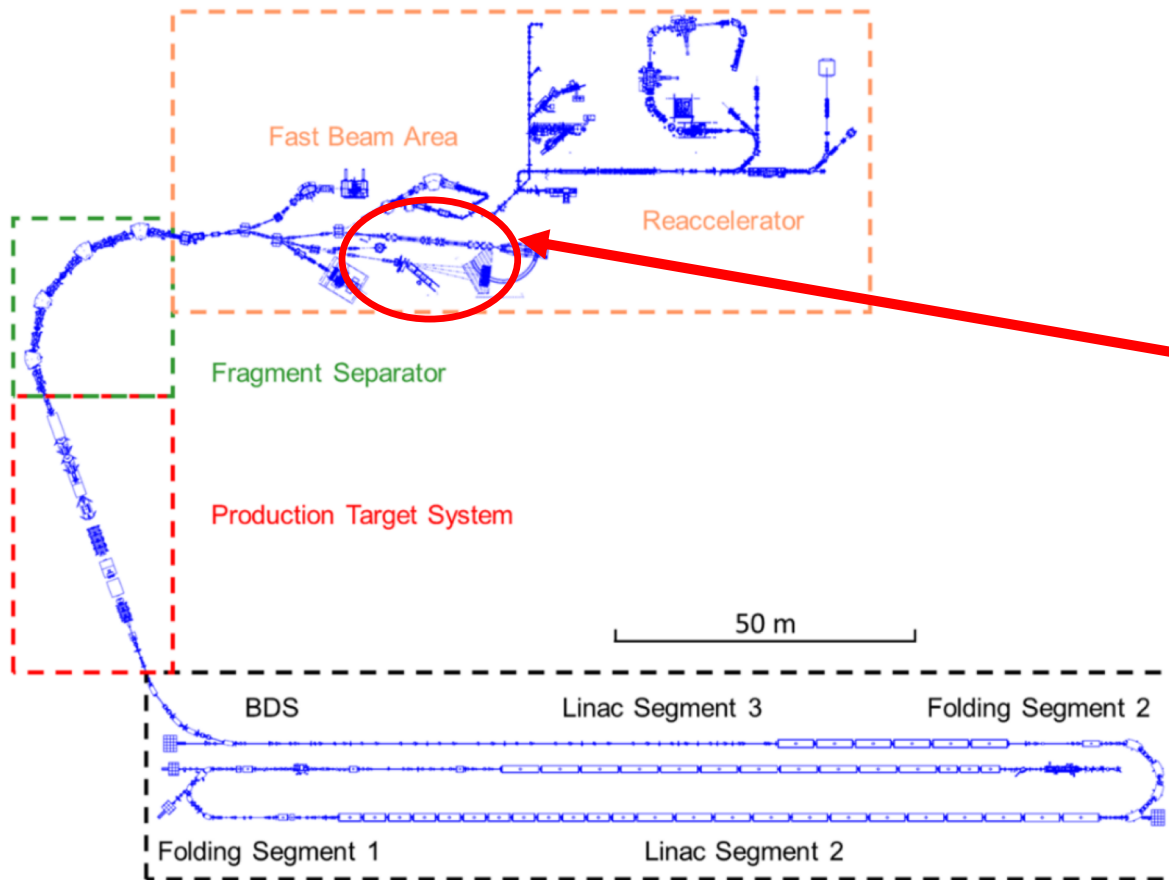
- FRIB Facility: FRIB200 (now) → FRIB400 (>2028)
- Physics cases at supra-saturation densities
- Physics cases @ FRIB (and FRIB400)
- Proposal 23058 @ PAC3 – Participation
- Transport model simulation organization
- Proposed strategy: Lol + Proposal

# FRIB facility



- **Fast beams:** Furthest reach towards neutron-rich nuclei – exploit variety of direct reactions, neutron, charged-particle and  $\gamma$ -ray spectroscopy, time-of-flight mass measurements, *HIC*
- **“Stopped” beams:** Precision decay measurements ( $\beta$ ,  $\beta_n$ ,  $\beta_p$ ,  $\alpha$ , isomer, p, 2p ...), high-precision mass spectrometry, laser spectroscopy, tests of fundamental symmetries
- **Reaccelerated beams:** Direct reactions, fusion, capture reactions, Coulomb excitation around the Coulomb barrier (no chemistry limitation unlike with ISOL)

# FRIB facility

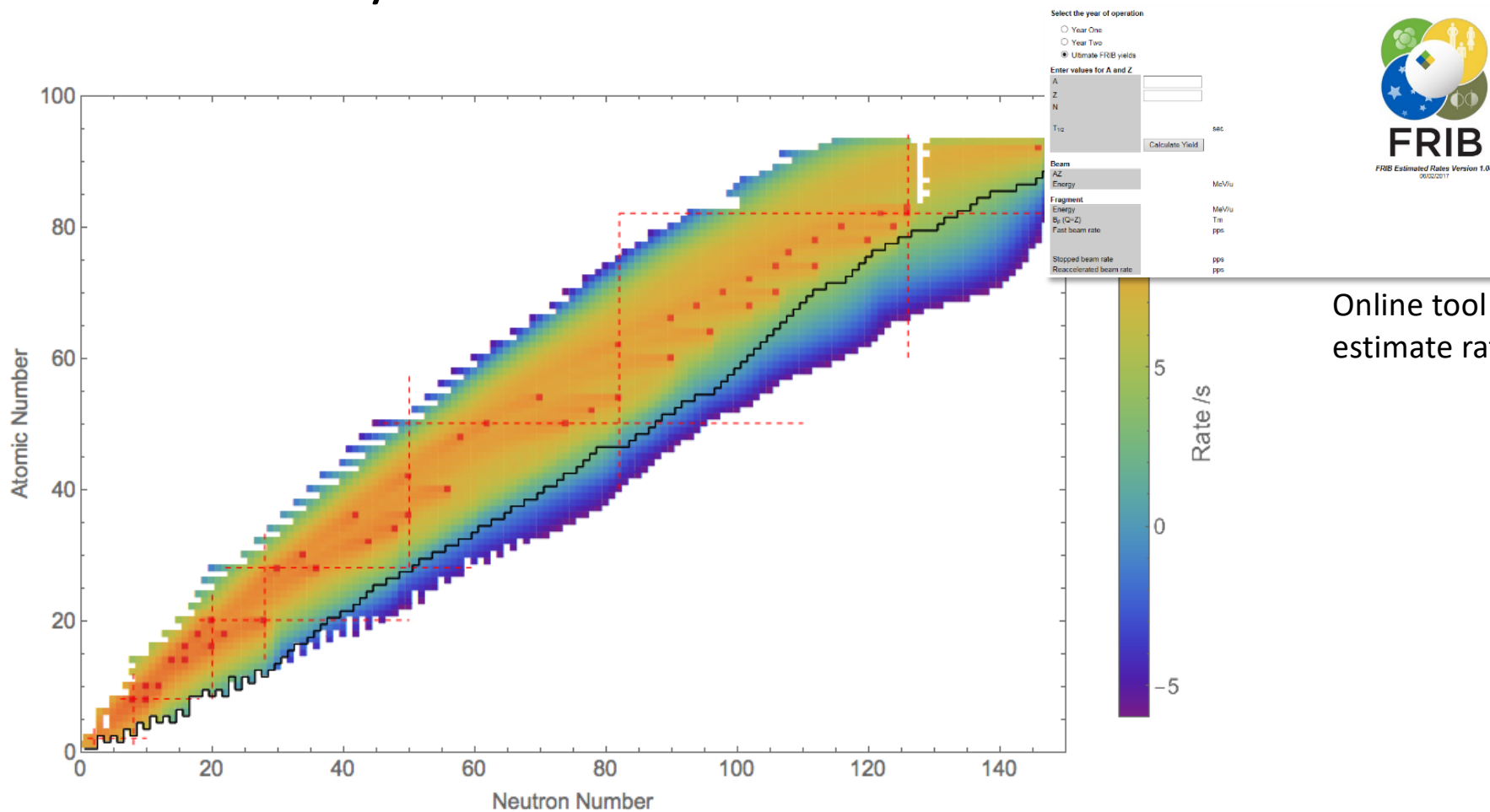


N2 vault

- LANA (Large Area Neutron Array)
- HiRA (High Resolution Array)

**EoS experiments**

# FRIB facility



Online tool to estimate rates