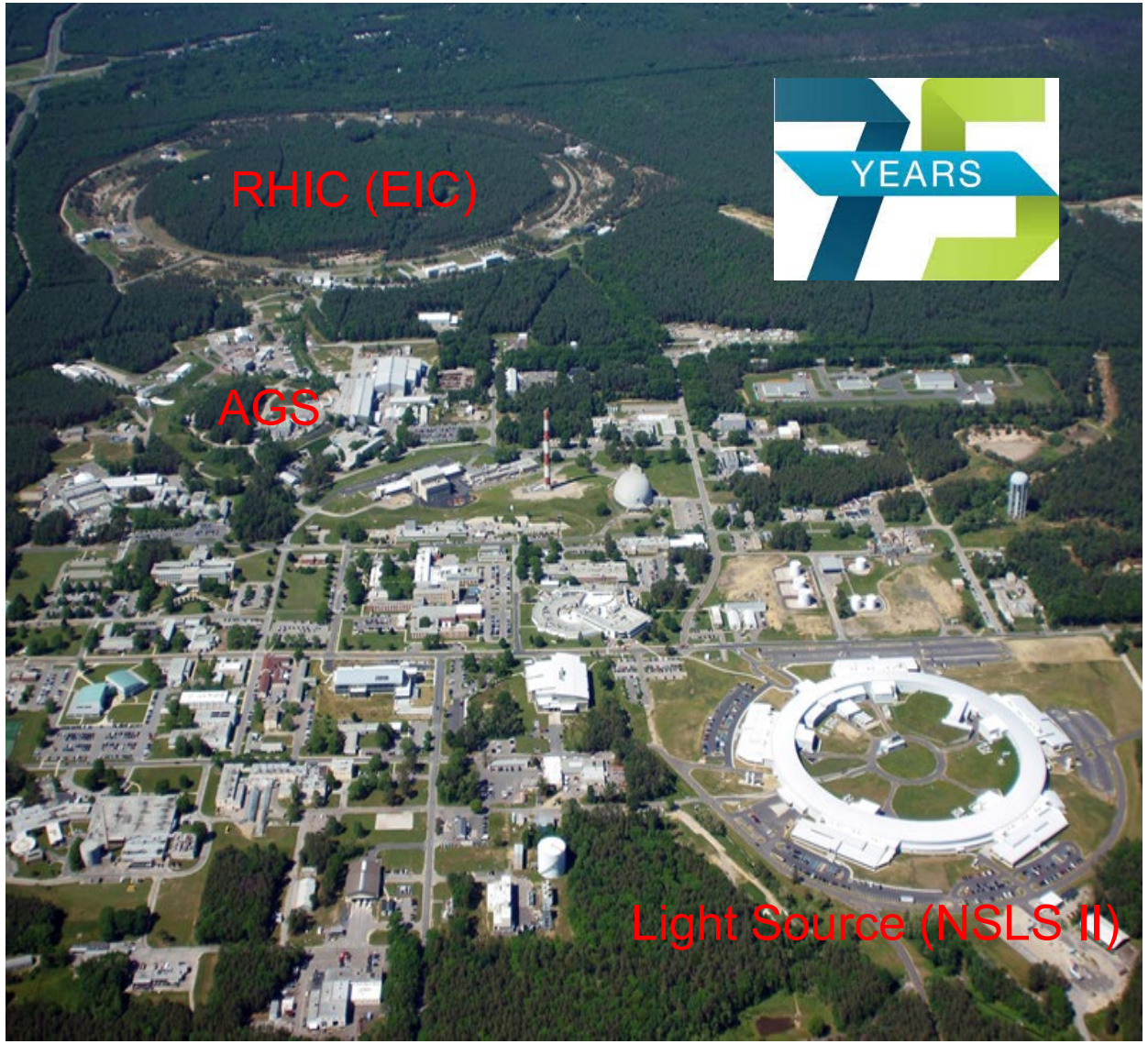
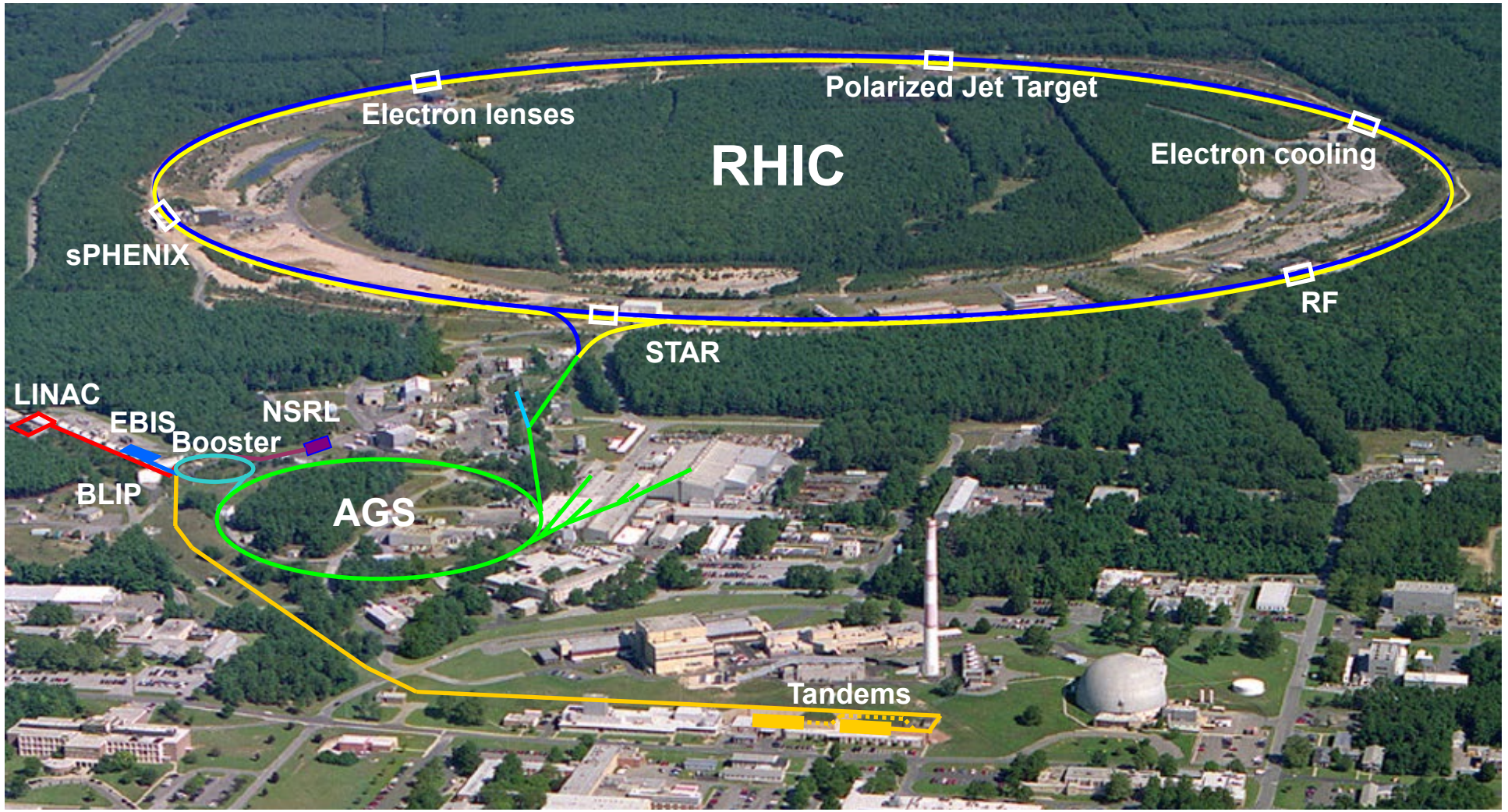
Brookhaven National Laboratory



- **Physical Assets**
  - 5,000 acres
  - 300 buildings
- **People**
  - 2,700 staff
  - Lab supports over 4,400 guests/users per year
- **FY22 costs $700 million**
- **Three largest programs**
  - Nuclear Physics
  - Basic Energy Sciences
  - High Energy Physics

Brookhaven National Laboratory

Proton and Heavy Ion Complex

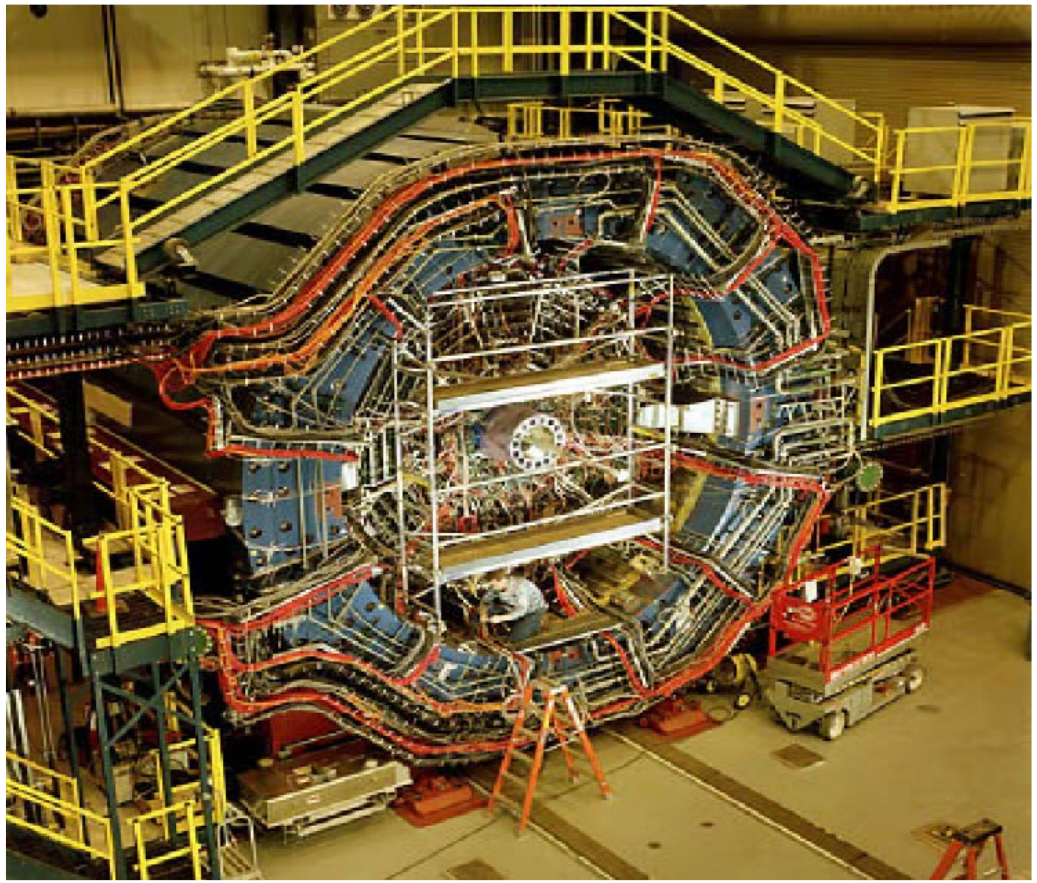


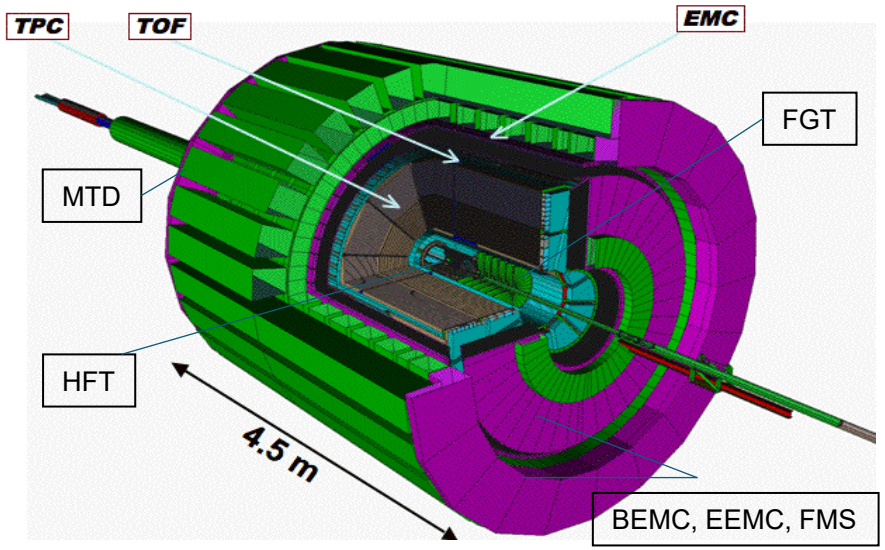
Highly flexible and only US based particles collider

Injectors provide beams for unique applications

STAR Experiment at RHIC, sPHENIX just Started

Using the STAR detector, an international collaboration is working to understand the nature of the early universe and the tiniest building blocks of matter through the study of nuclear collisions at some of the highest energies achieved in the laboratory





- 2 π Detector
- Large TPC and Solenoid
- >10 Subsystems
- 580 Collaborators
- 59 Institutions
- 12 Countries

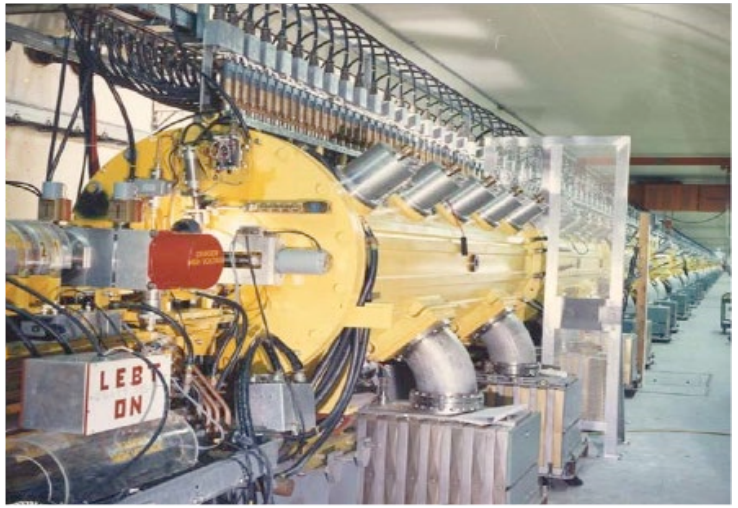
NASA Space Radiation Laboratory

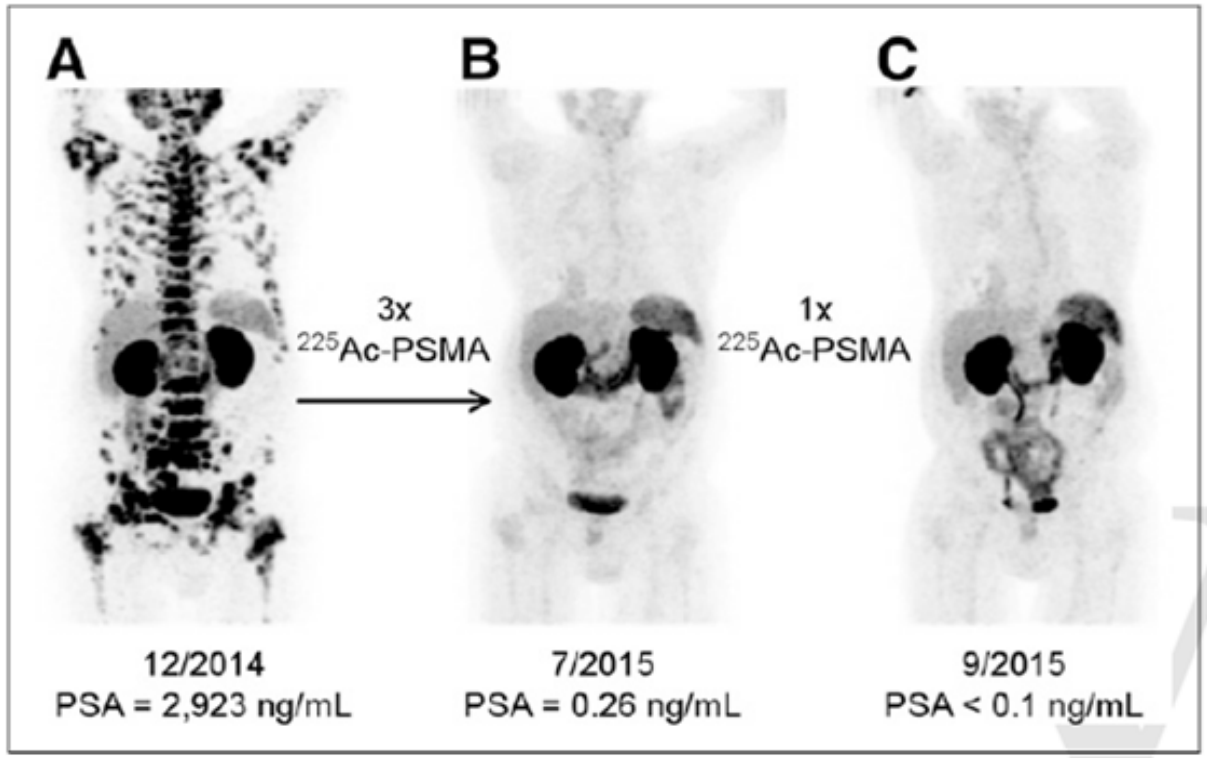
Started in 2003, simulates galactic radiation for space flights

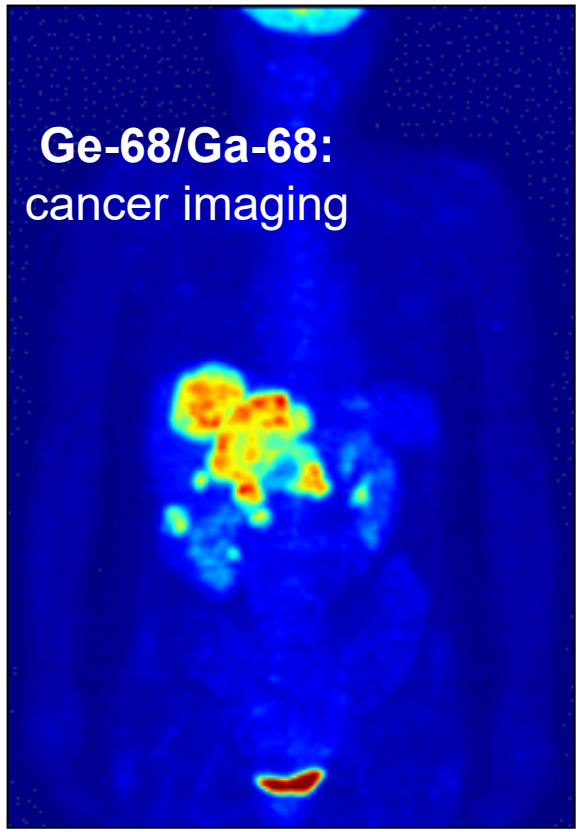
- Heavy ion beams from AGS Booster
- Electron Beam Ion Source (EBIS) provides all necessary ion beams
- New laser ion source for EBIS allows for rapid species switching to simulate accurately deep space radiation field

Medical Isotope Program

- Target irradiation with 200 MeV protons
- Production of medical radio-isotopes for U.S.
- R&D of new radio-isotopes for diagnosis and therapy of cancer







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Electron Ion Collider - Next Collider in US

EIC Design Goals

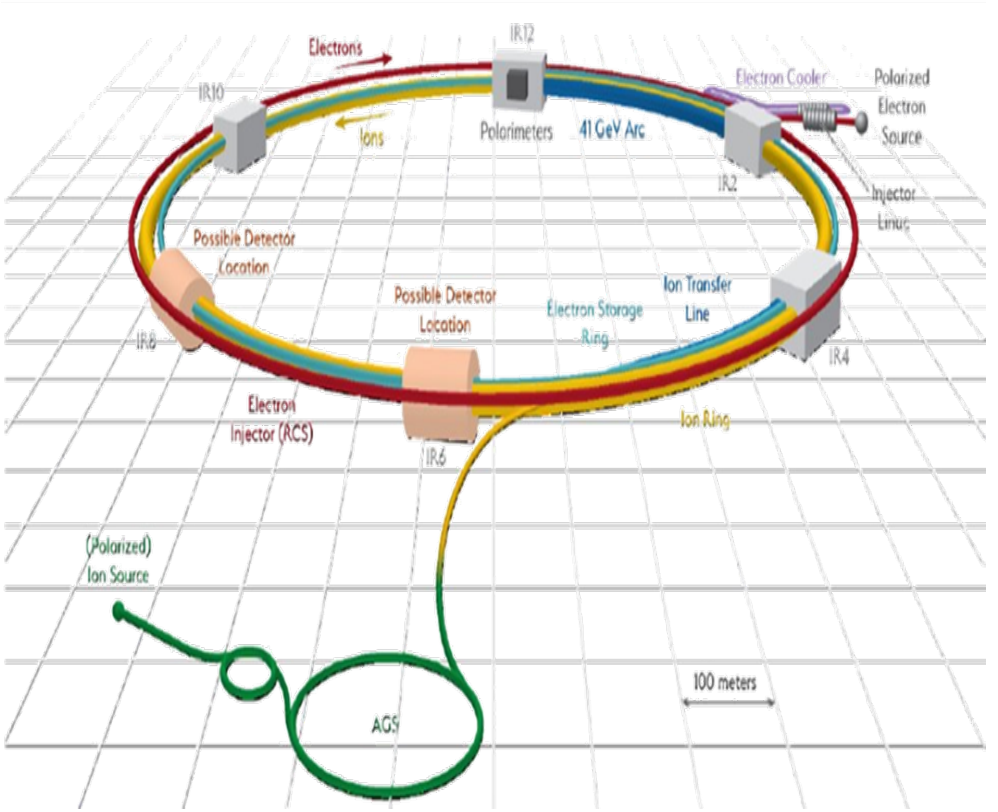
High Luminosity: L= 10^{33} – 10^{34}cm^{-2}sec^{-1}, 10 – 100 fb^{-1}/year

Highly Polarized Beams: 70%

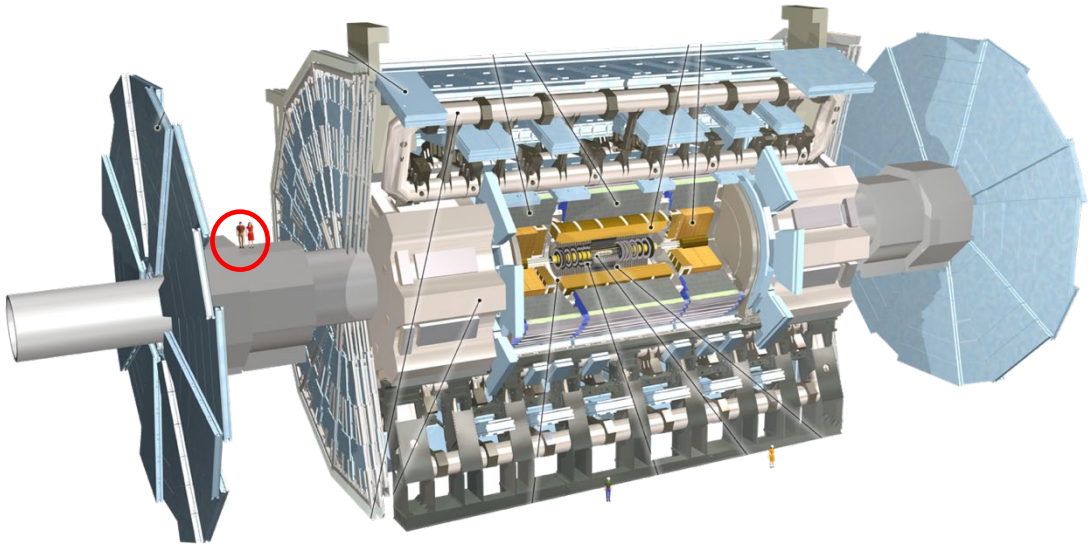
Large Center of Mass Energy Range: E_{cm} = 20 – 140 GeV

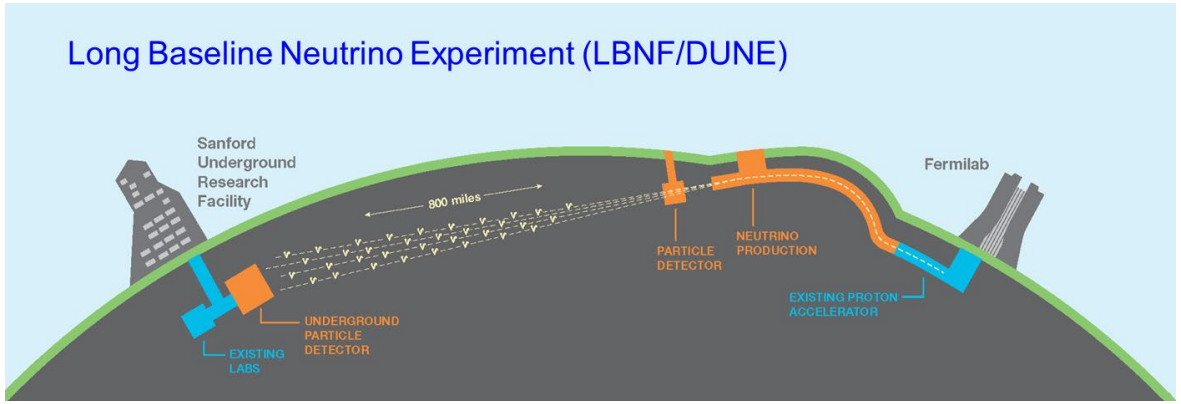
Large Ion Species Range: protons – Uranium

Large Detector Acceptance



Particle Physics Experiments





- Largest experiments BNL is deeply involved
  - ATLAS at the LHC and DUNE at Fermilab
- Both have high irradiation requirements
  - ATLAS and the LHC – irradiation of the accelerator and detectors
  - DUNE and LBNF – production of the neutrino beams

Importance of Materials Irradiation Studies

- Accelerator based facilities and experiments in nuclear and particle physics require, in many cases, high irradiation
  - To produce secondary particles
  - As backgrounds from accelerator induced sources
  - Reactor based experiments require high irradiation as well
- It is critical to understand effects of the irradiation, develop new materials and technologies to be able to handle even higher radiation fluxes
  - RaDIATE efforts are extremely important and valuable
- BNL has unique facilities and expertise
  - Hadron accelerator complex to irradiate samples
  - Handle highly irradiated materials
  - Study irradiated materials, including using light source

BNL Light Source (NSLS II)

Welcome to BNL

Have productive Collaboration Meeting

Enjoy talks, discussions, events and tours

Be safe!