Plans for Accelerator Working Group

J. Scott Berg
Brookhaven National Laboratory
IDS Plenary Meeting
16 January 2008

Accelerator Systems Goals

- 10^{21} decays per 10^{7} second year toward targets
- 25 GeV total energy muon beam
- Keep the cost down

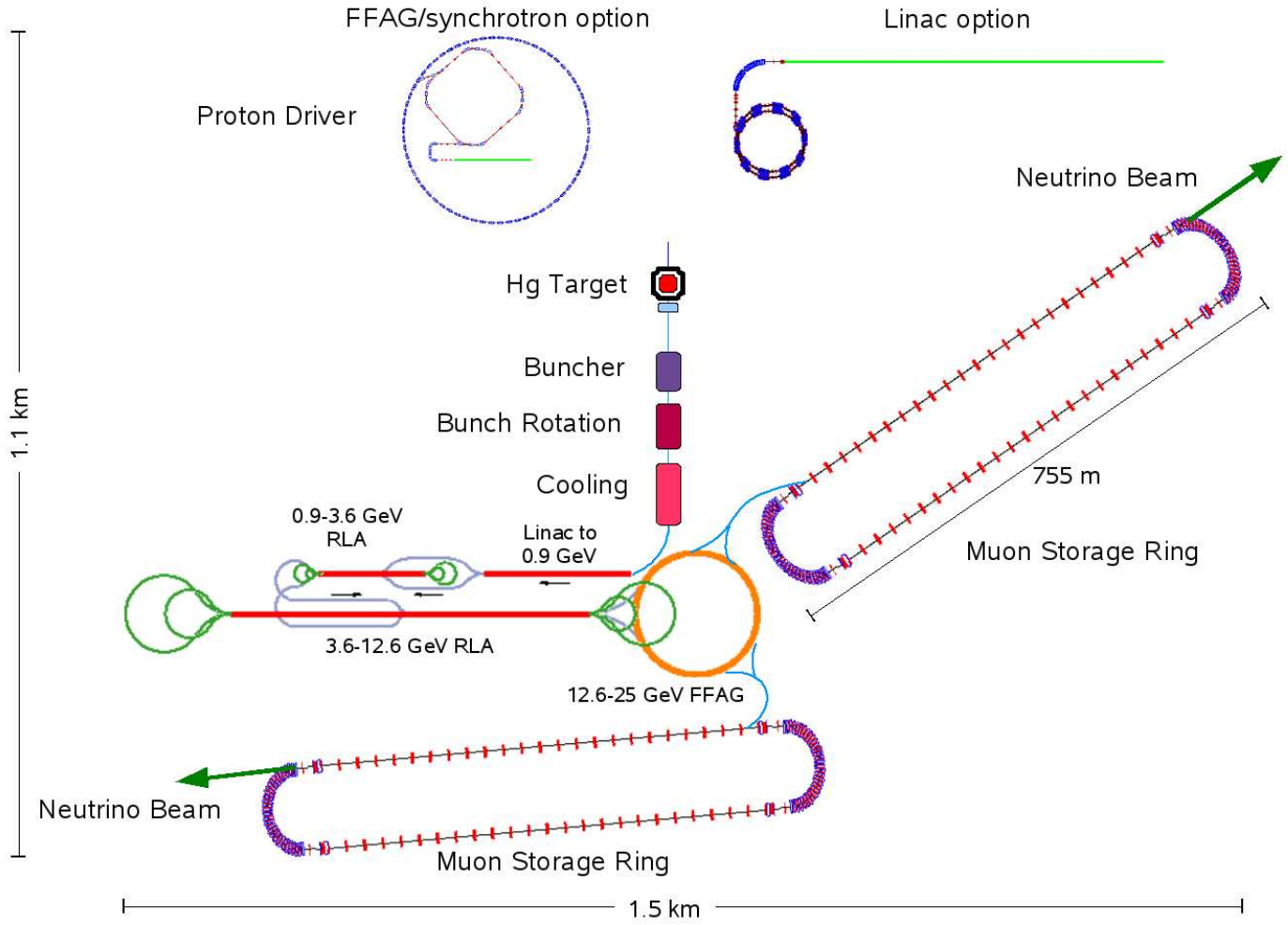
Accelerator Systems Components

- 4 MW proton driver 4 MW
  - 2 ns bunch length
  - 50 Hz, 3 bunches
- Mercury jet target
- Capture and phase rotation: 200 MHz train
- Cooling: “maximum” transmission into 30 mm transverse, 150 mm longitudinal acceptance
- Capture through cooling baseline: ICOOL file

Accelerator Systems Components

- Acceleration: to 25 GeV
  - Linac to 0.9 GeV
  - 2 dogbone RLAs, to 3.6 and 12.6 GeV
  - FFAG to 25 GeV
- Two 25 GeV racetrack storage rings
  - Handle both signs simultaneously
  - 0.1/γ RMS angular divergence

IDS Accelerator Systems



Work Plan

- Proton driver
  - Get $\geqslant 1$ outline design meeting specs
  - Different design types to make comparison
- Target
  - Analyze MERIT data
  - Engineering of target infrastructure

Work Plan

- Capture through cooling
  - Convert ICOOL files to readable format
  - MUCOOL results for maximum field on cavities
    - Re-design systems if needed
- Acceleration
  - Design of subsystems
  - Design of transfer lines
  - Tracking

Work Plan

- Storage ring
  - Redesign to current specificaitons
  - Tracking
    - Determine neutrino flux
- Tracking through entire system

Concerns

- Required bunch train spacing too short (40 μs total)
  - MERIT data: is 200 μs acceptable? If not
    - Analyze difficulty of handling shorter time
    - Re-design proton driver for one bunch
- Injection/extraction difficult in acceleration
  - Analyze chicane injection for RLAs
  - Analyze kickers for FFAGs
  - If not possible, re-design acceleration layout

Alternatives/Improvements

- Improved Neuffer phase rotation scheme
- Scaling FFAG for lower energy acceleration
- Solid target options

Next Steps

- Produce set of “deliverables”
- Assign names
- Attempt some sort of time scale