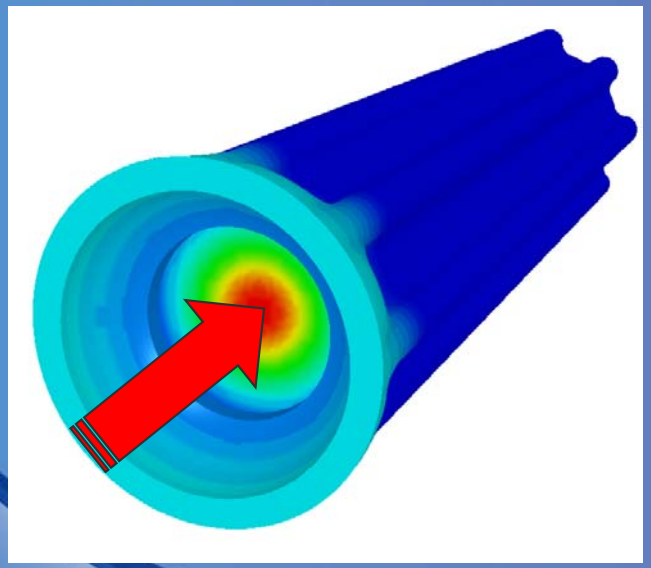
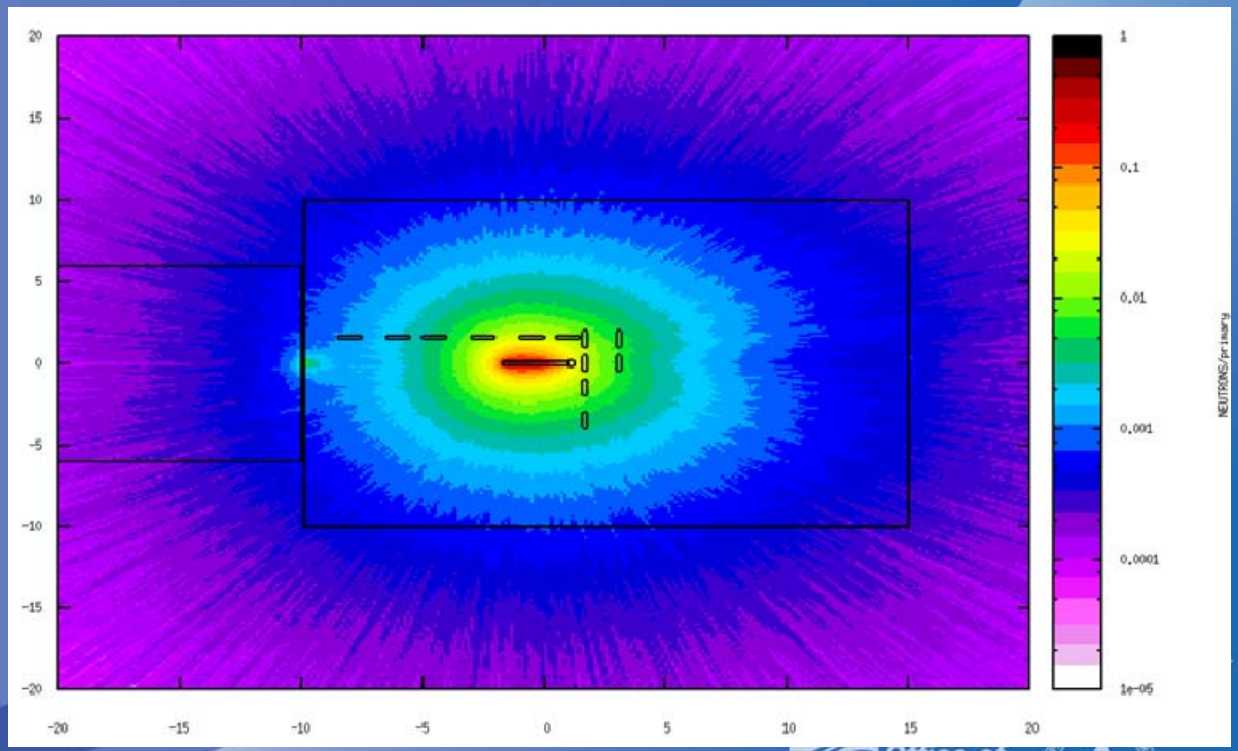
ADSR/Spallation Target R&D Session

N. Simos & F. Meot





Office of Science
U.S. DEPARTMENT OF ENERGY

ADSR: not just a reactor with a switch!

It is an integrated system that involves:

Power (it is a multi-MW system)

Desired spectra & spatial distribution
(challenges in its optimization)

Target and its Configuration
- proton beam window
- spallation target
- System power management

Radiation effects on materials
- radiation damage from protons and neutrons
- thermo-mechanical shock and thresholds

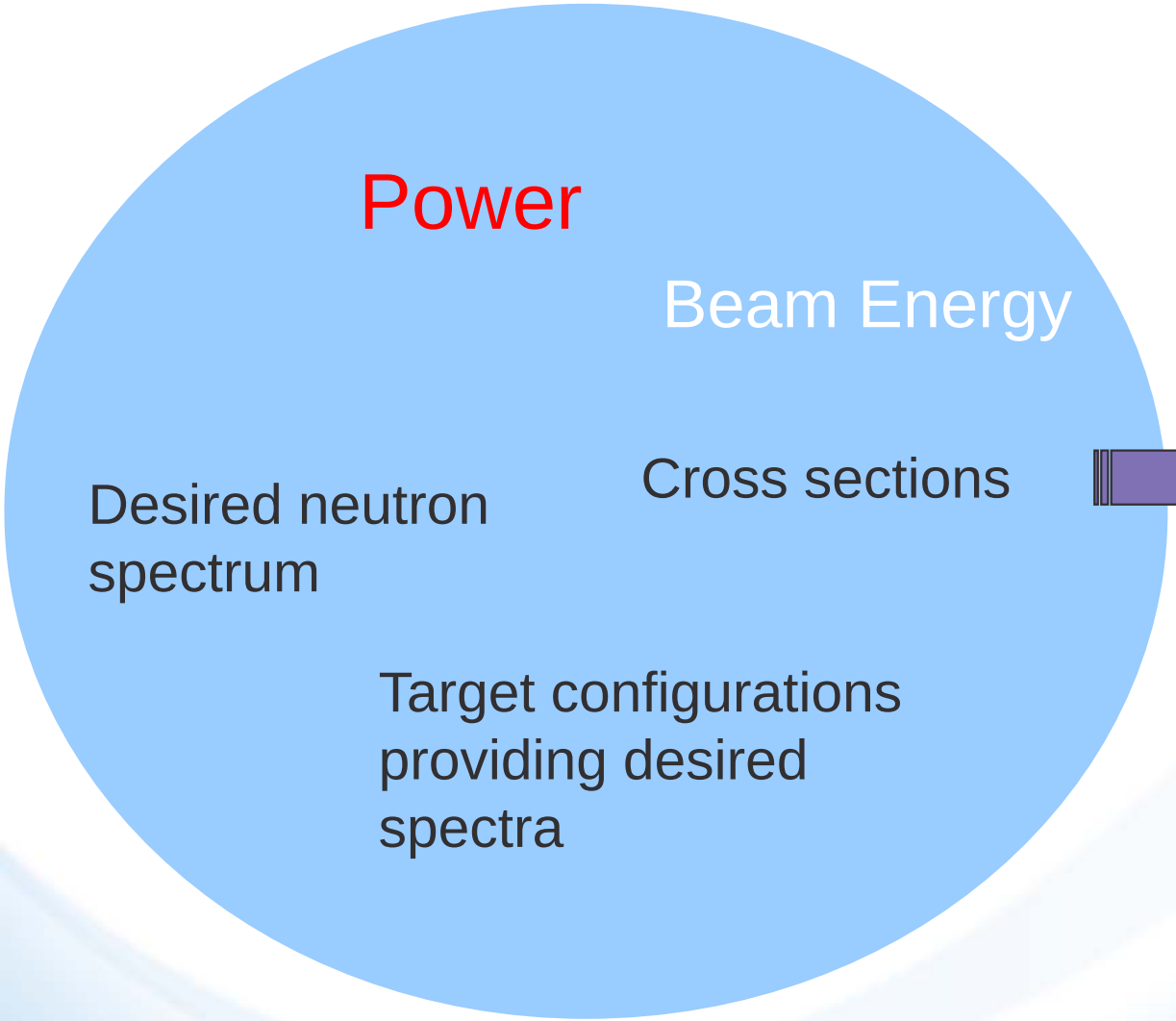
OBJECTIVE is to hear from the community thoughts on:

ADSR: Reality check and future prospects

Experience in operating high power accelerators and the issues that surfaced along the way (SNS, ISIS, etc.)

Relevant experimental activities or dedicated beamlines addressing one or more issues that are of direct or indirect relevance to ADSR (e.g. HiRadMat)

What is the “optimal” Parameter Space?



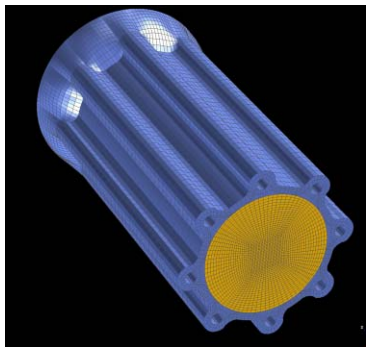
What is the optimal path to get there?

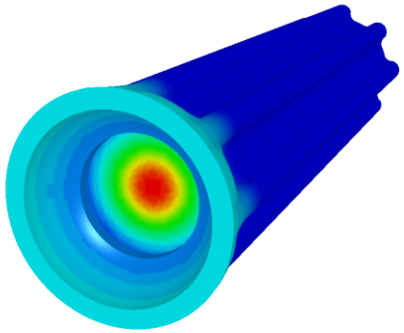
Experiments
Verification Studies
Experience

4+ MW Proton Drivers - Realistic ?

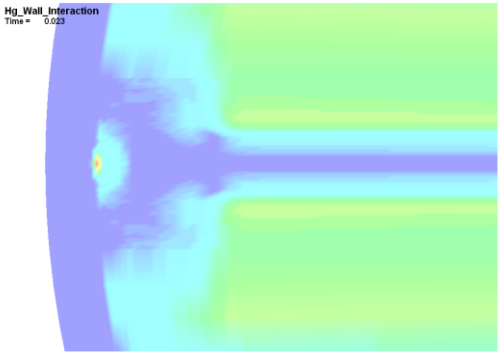
- An order of magnitude higher of operating drivers
- Are sub-systems capable in dealing with such power?
- Target may represent a tiny portion of the overall infrastructure, its role in the functionality of the system is, however, paramount
- Since no **one-size-fits all** works, the target choice must satisfy accelerator parameters that are set by physics
- Unfortunately, it is a two-way negotiation !!!!

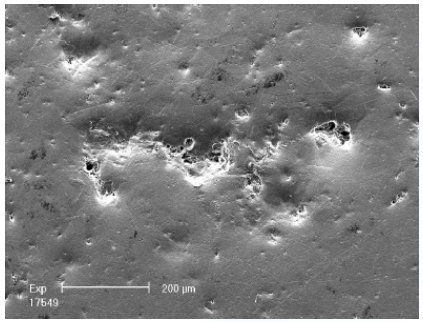
Solid?
Limitations?



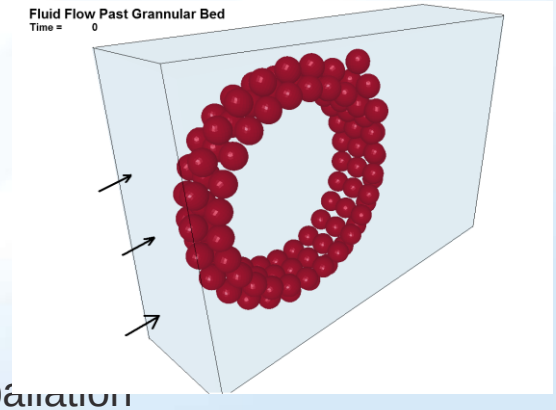


Liquid?





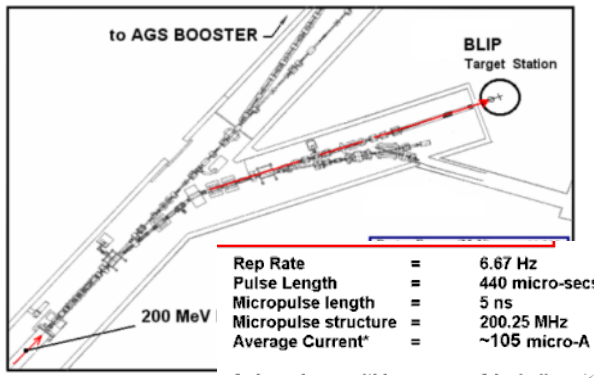
or something in-between?

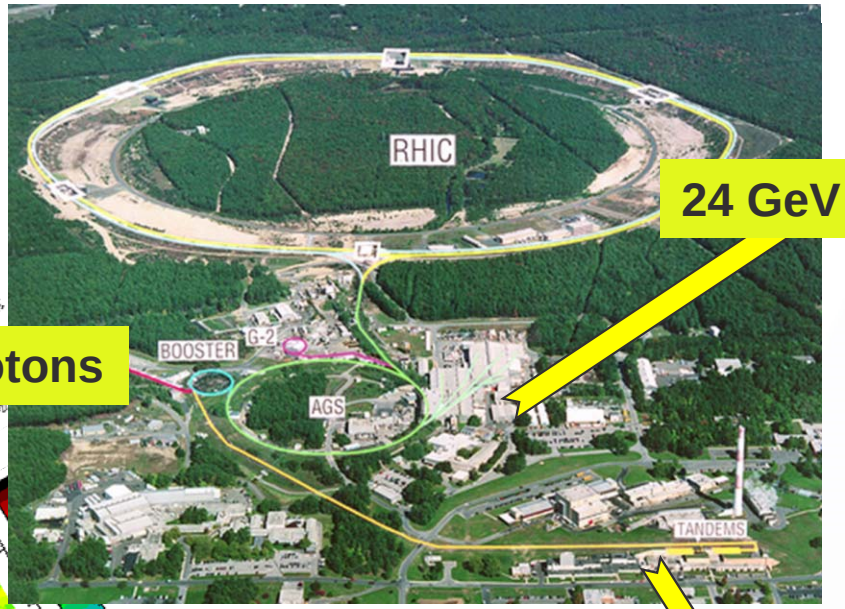


RECOMMENDATIONS on ONGOING Experimental activities at BNL geared towards ADSR open issues

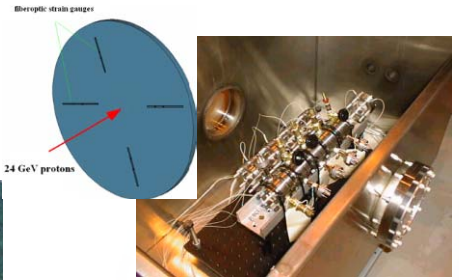
BNL Activities cover radiation damage to materials
200 MeV protons
Fast Neutrons
Tandem van de GRAAFF 28 MeV protons and ions

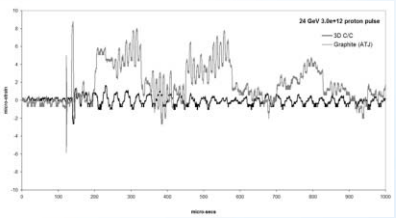
ADS and Spallation Target Experiments



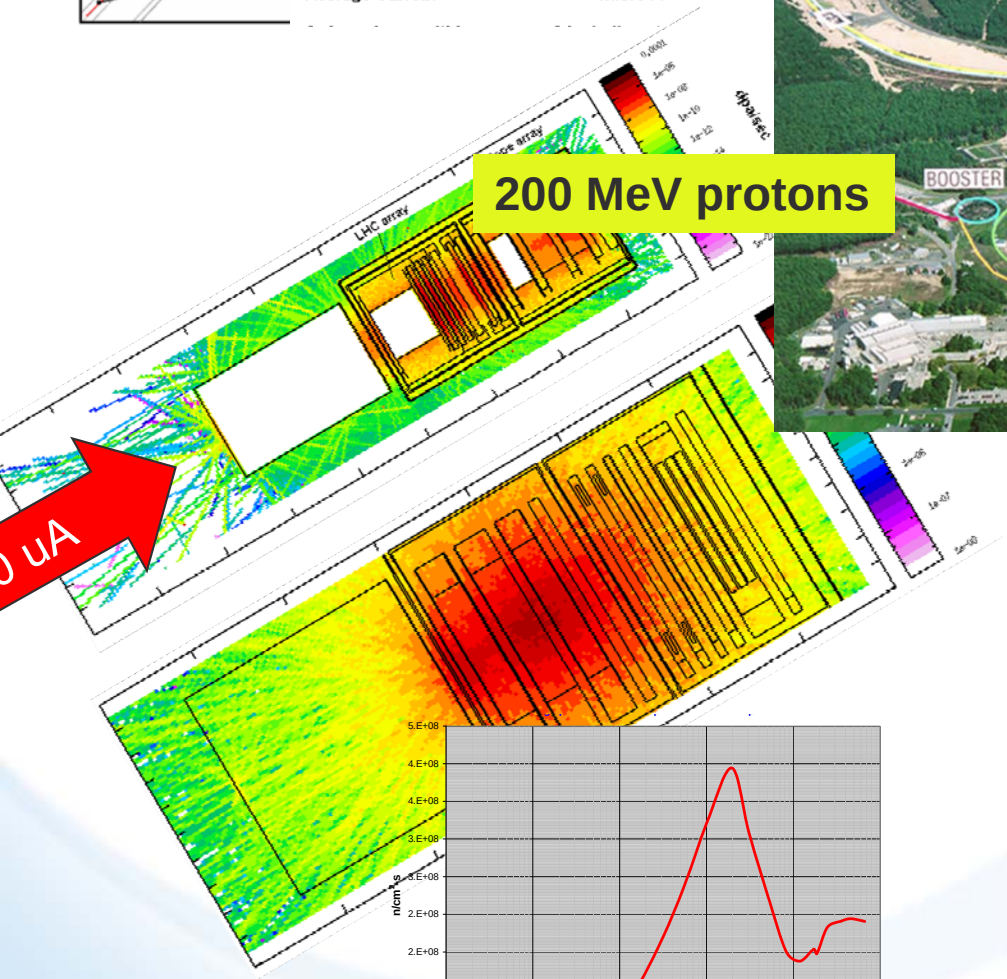


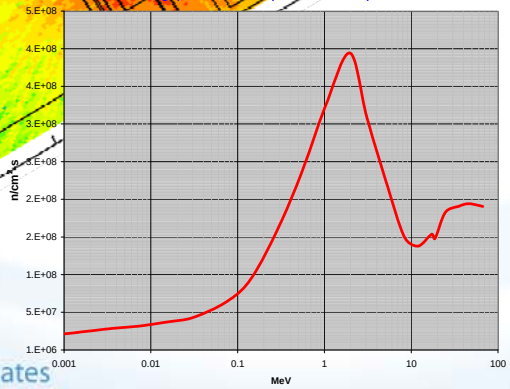
24 GeV protons



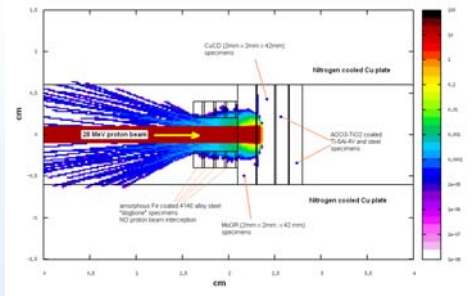


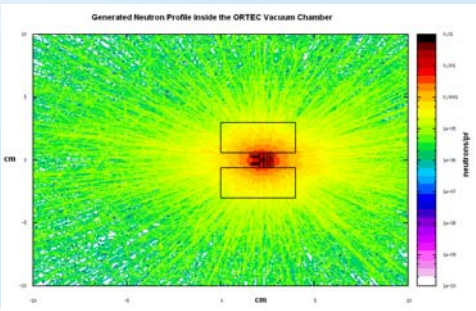
200 MeV protons



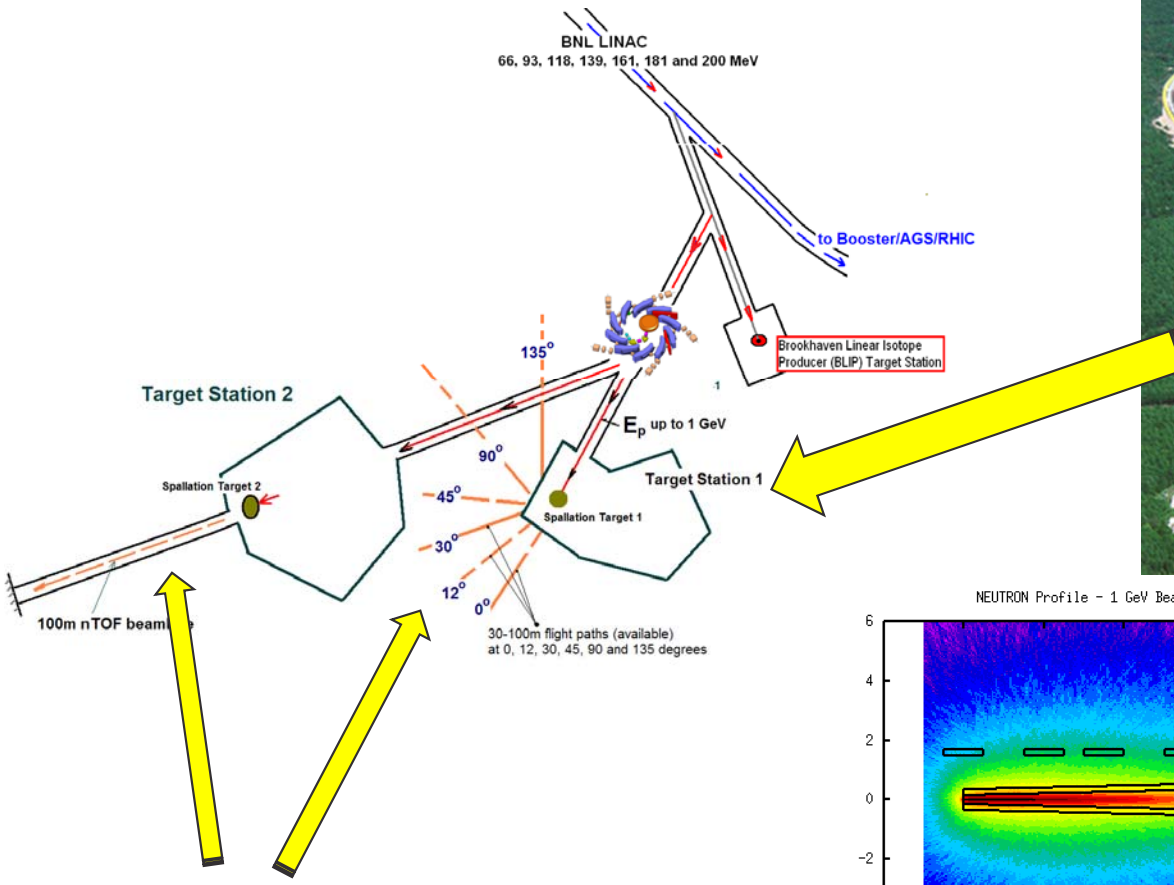


28 MeV (1 u… 200 x 200 um x um) protons

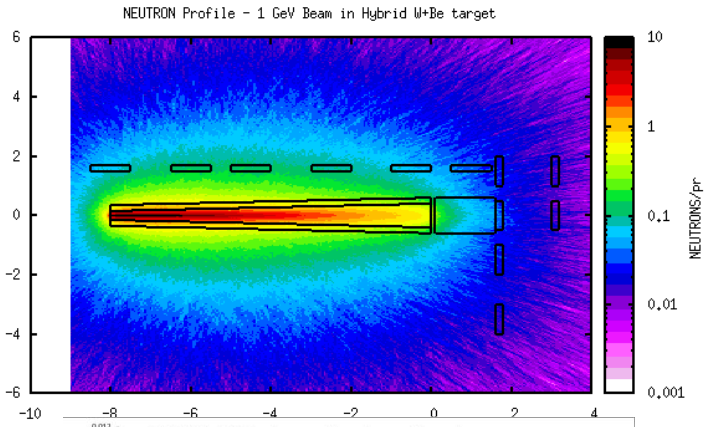


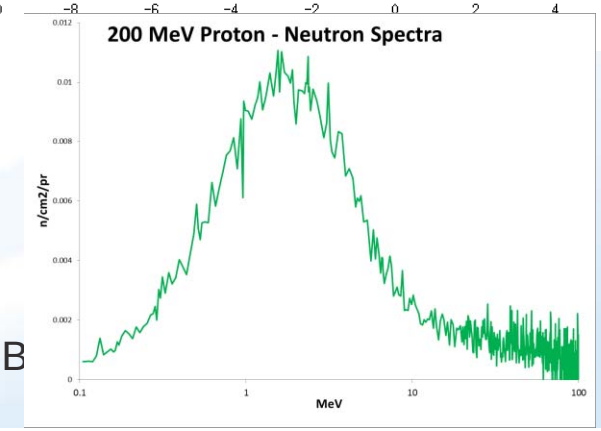


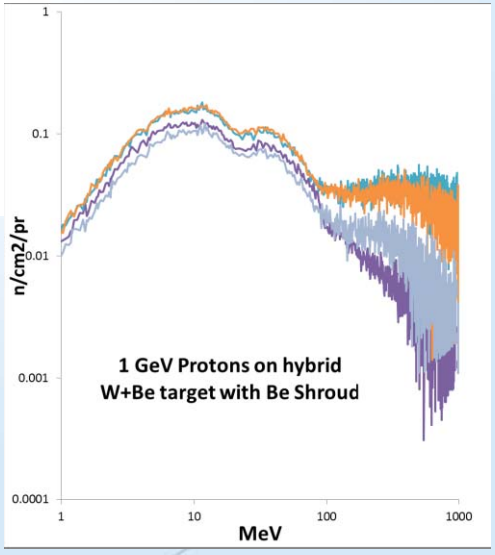
Beamlines & Experiments under study



Unique potential for Nuclear Cross Sectional data







THB