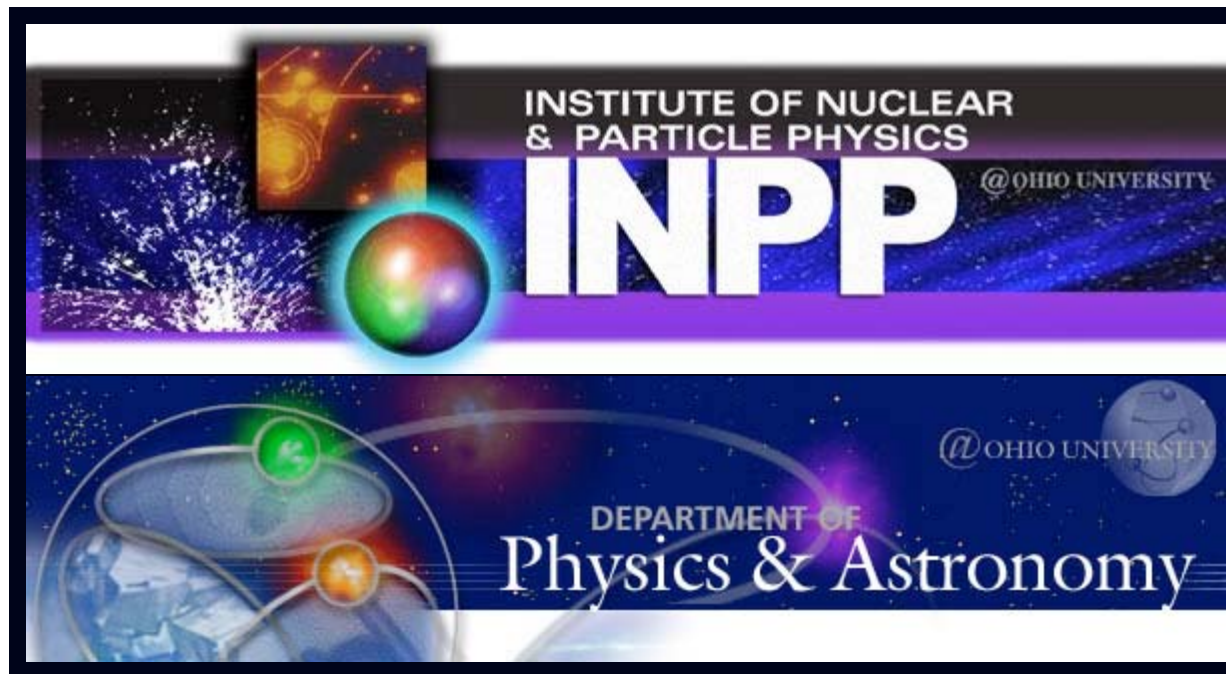
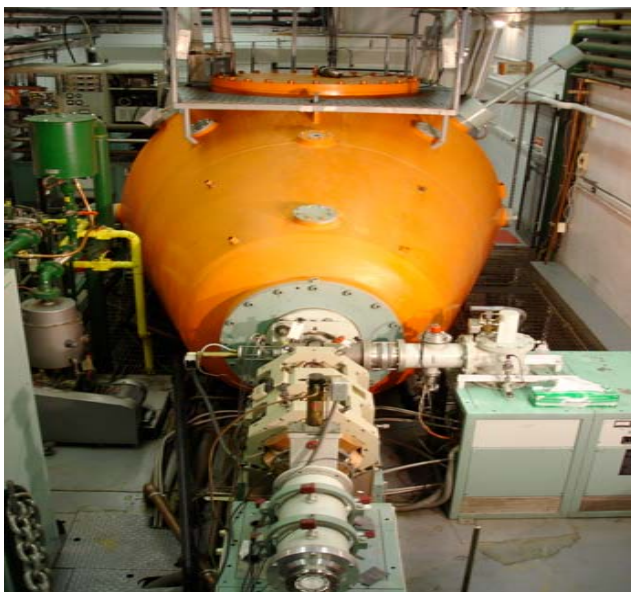


Applied Nuclear Science

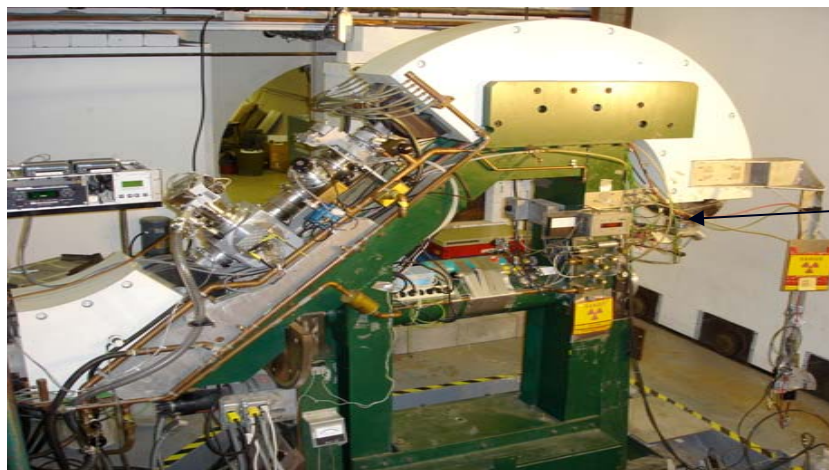
Carl R. Brune
Ohio University, Athens Ohio



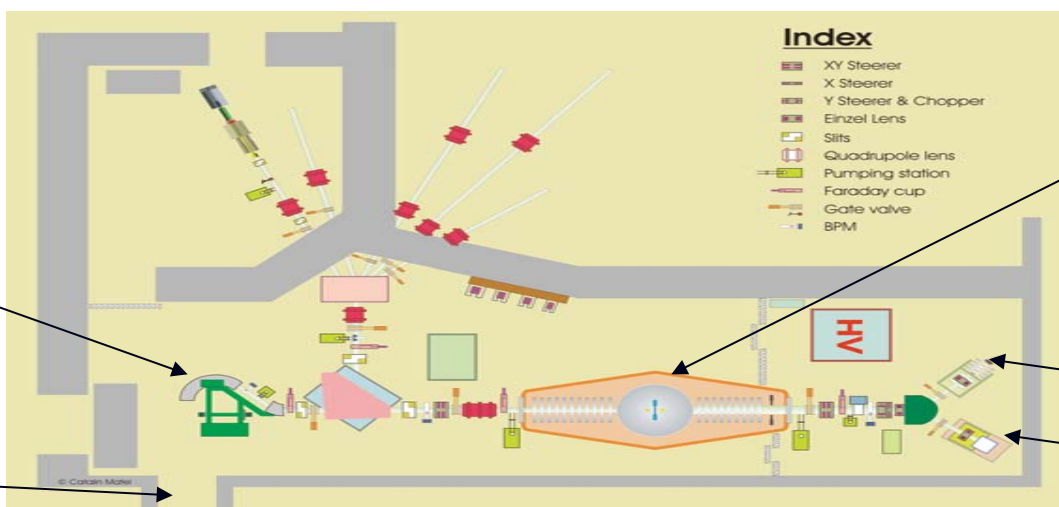
Beam Swinger Neutron Time-of-Flight Facility at Ohio University



Edwards Accelerator Laboratory



Target chamber



Swinger Magnet
($-4^\circ \leq \theta_{lab} \leq 158^\circ$)

30-meter TOF
Tunnel

4.5-MV
T-shaped tandem

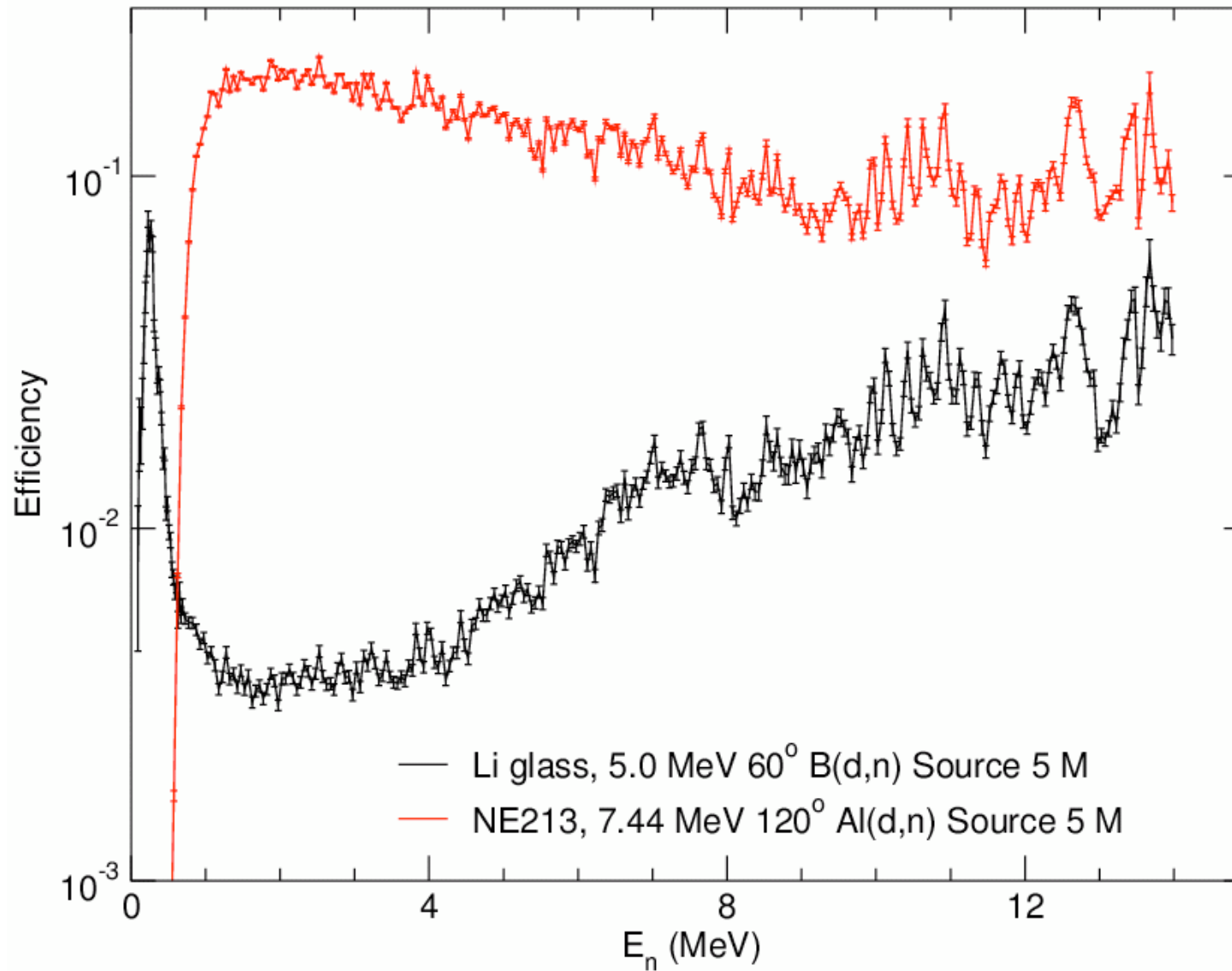
Cs Sputter Source

Duoplasmatron He Source

Neutron Physics Capabilities

- Pulsed Beam / Time-of-Flight / Beam Swinger
- Mono-energetic neutron sources (d+d, d+t, $^{15}\text{N}+\text{p}$,...)
- White (thick-target) sources ($^9\text{Be}+\text{d}$, $^{11}\text{B}+\text{d}$, $^{27}\text{Al}+\text{d}$,...)
- Neutron Detectors: NE-213, Li-glass
- Routine calibration of neutron detectors at the few % level

Neutron Detector Calibration



Some Projects

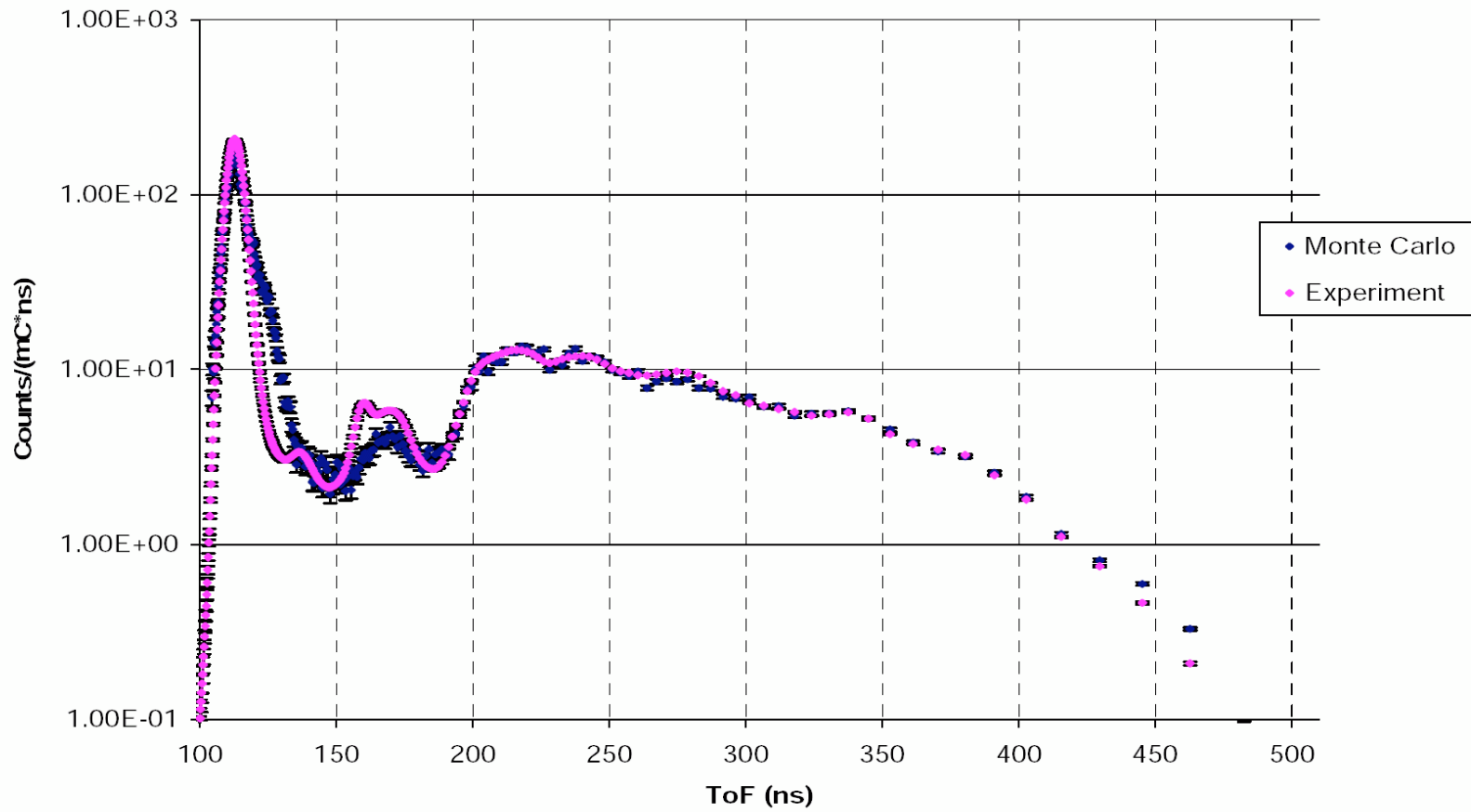
Past Projects:

- Medical Physics -- neutron spectra for cancer therapy
- Neutron Imaging (LLNL / Jim Hall)
- Neutron-induced single-event upset studies (LLNL)
- Neutron Detector Development (Photonics, Inc.)
- Dosimeter Calibration (Overhoff Technology, Inc.)

Ongoing Projects:

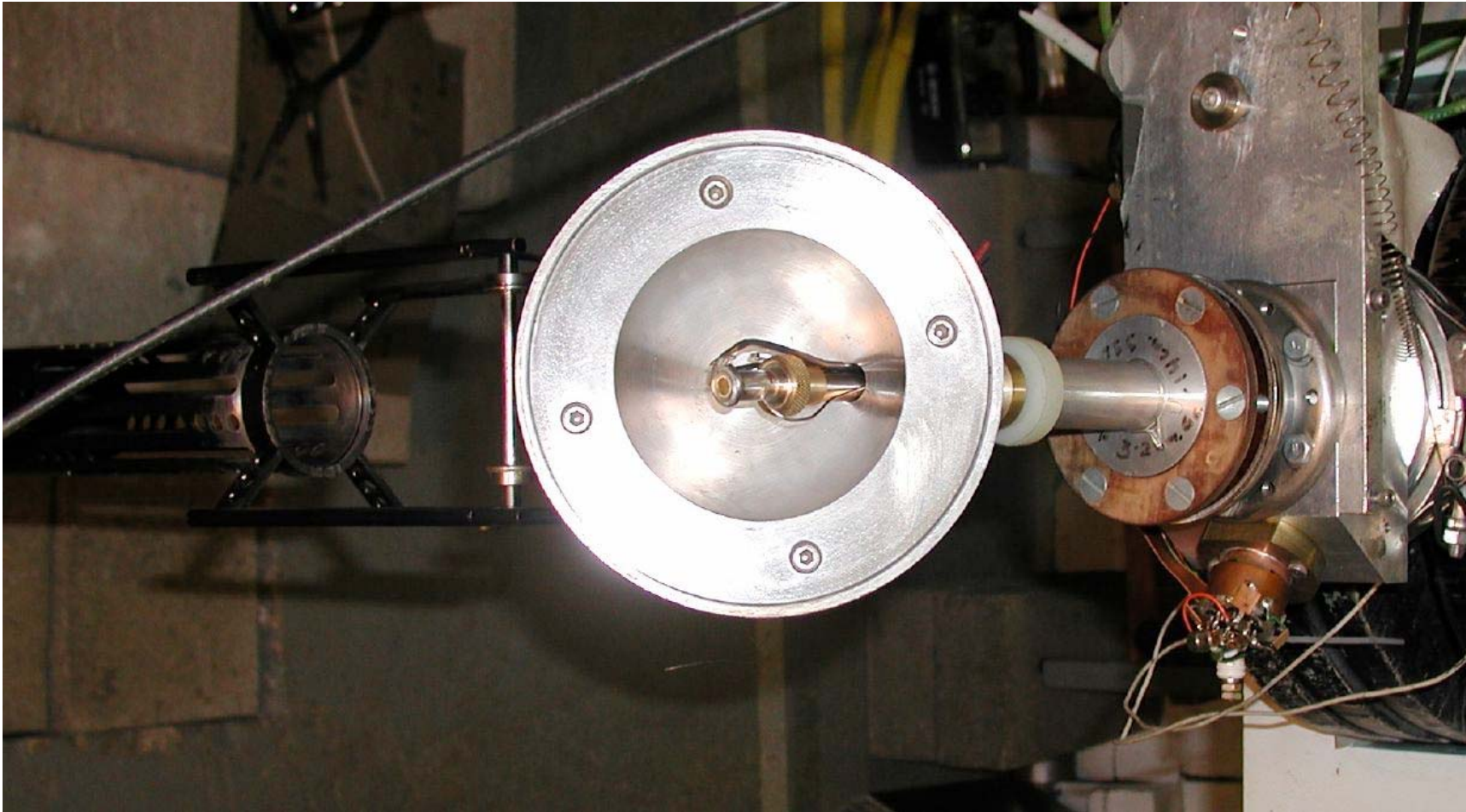
- Fast neutron transmission in iron
- Cross section measurements for Inertial Confinement Fusion
 - ${}^3\text{H}(d,\gamma)$
 - γ -ray production 14-MeV neutrons
- ${}^{12}\text{C}(n,2n){}^{11}\text{C}$ (Houghton College, SUNY Geneseo)

Pulsed Iron Sphere Measurements



Previous data (M.T. Wenner et al.) taken with a mean source energy of 7 MeV and a 5-m flight path. The comparison to the simulation suggests the ENDF-B/VI library for $n+^{56}\text{Fe}$ needs improvement.

The Iron Sphere Setup



Recent Outside Users

Date(s)	PI	Institution - Project
10/30/2011-11/4/11	C. Lawrence, A. Enqvist	University of Michigan Detector Calibration
11/7/11-11/11/11	B. Czirr, J. Ellsworth	Brigham Young University Capture Gated Detector Efficiency
11/14/11-11/17/11	D. Sayre, L. Bernstein	Lawrence Livermore National Lab. (n,n' γ) measurements
6/25/12-6/30/12 7/9/12-7/13/12	S.Padalino, M. Yuly	SUNY Geneseo, Houghton College $\sigma(E)$, $^{12}\text{C}(n, 2n)^{11}\text{C}$
9/5/12-9/9/12	James Hall	Lawrence Livermore National Lab. Neutron Irradiation
9/17/12-10/5/12	A.C. Larsen <i>et al.</i>	Oslo University Gamma Ray Strength Function
7/7/13-7/19/13	S.Padalino, M. Yuly	SUNY Geneseo, Houghton College $\sigma(E)$, $^{12}\text{C}(n, 2n)^{11}\text{C}$
8/02/13-08/09/13	B. Czirr, J. Ellsworth	Brigham Young University Capture Gated Detector Calibration
9/30/13-10/4/13	C. Lawrence	University of Michigan Detector Response Matrix
3/20/14-3/28/14	A. Enqvist, D. Murer	University of Florida, Arktis Inc. Detector Calibration, ^4He Detectors

Summary and Outlook

- Ohio University has unique and valuable capabilities for nuclear applications
- Potential challenges
 - Steady funding
 - Not the main focus of senior personnel