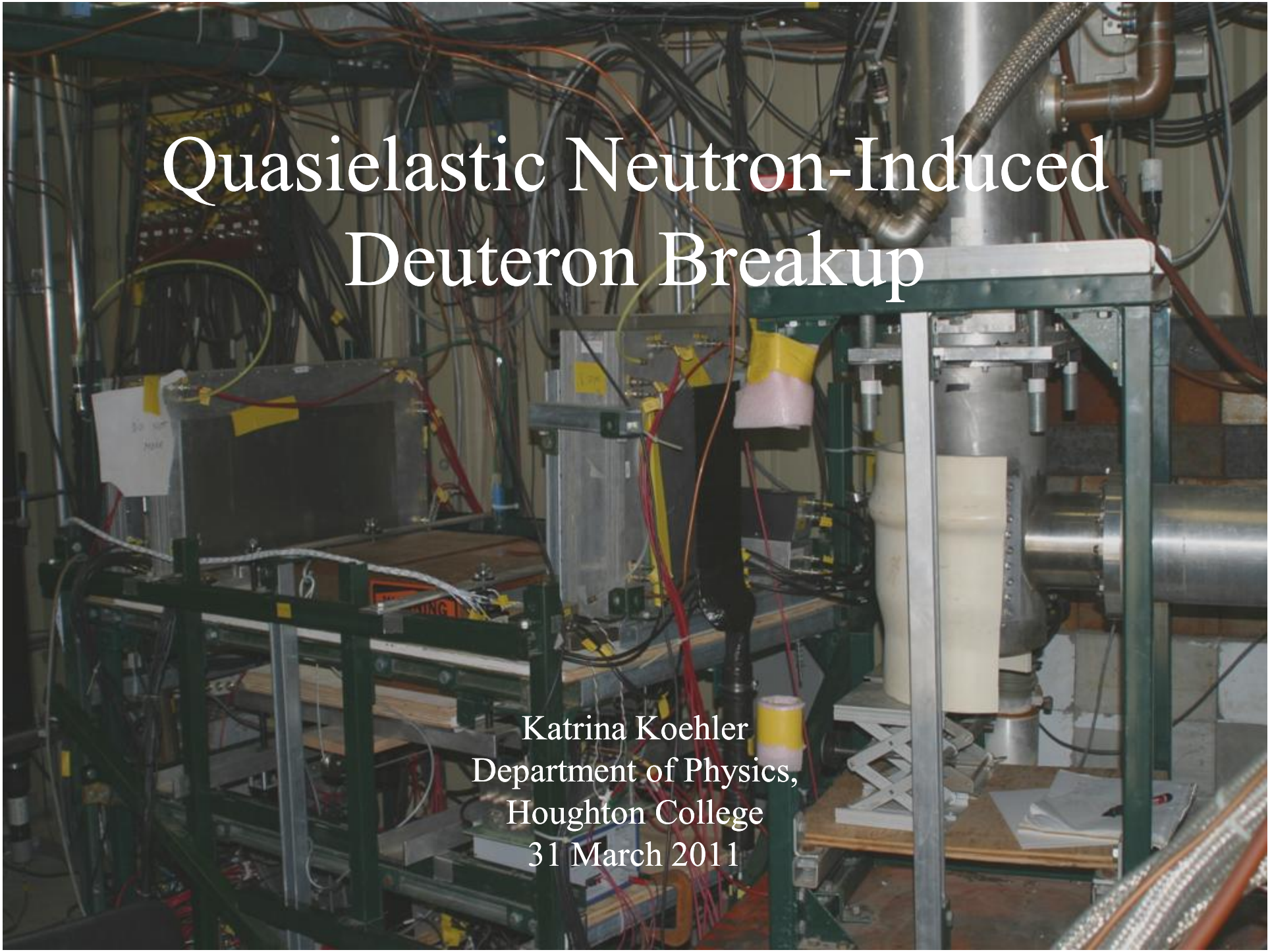

Quasielastic Neutron-Induced Deuteron Breakup

Katrina Koehler
Department of Physics,
Houghton College
31 March 2011

Deuteron Breakup

- Quasielastic deuteron breakup
- Motivation
- Description of Facilities
- Experimental Setup

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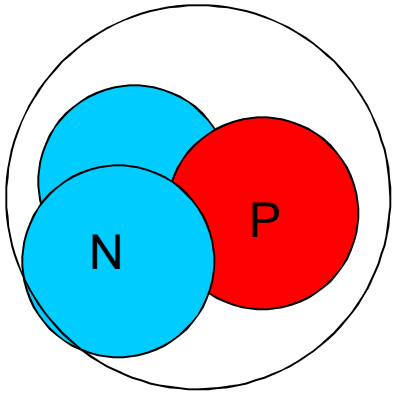
Deuteron Breakup



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Cross Sections

$$N_d = \sigma(\theta) N_{inc} N_t \Omega$$

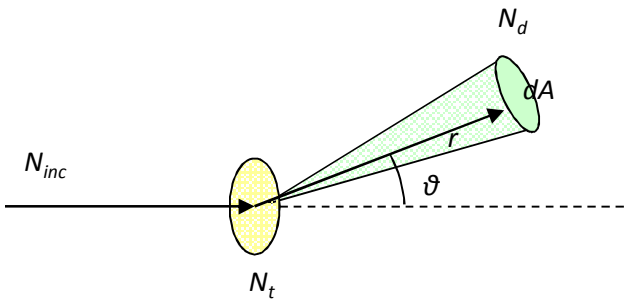
Events Detected

Cross Section

Number of Incident Particles

Number of Scattering Centers

Solid Angle



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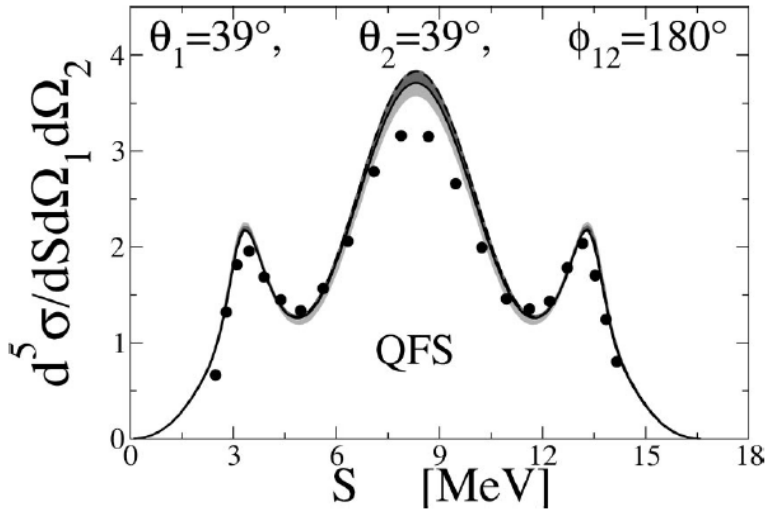
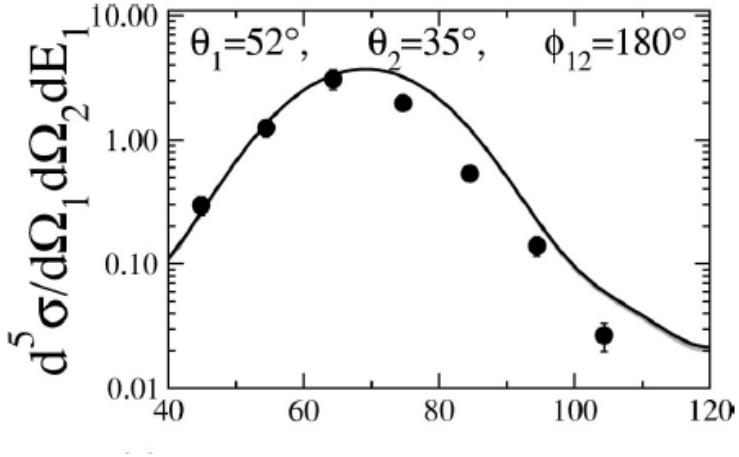
Motivation





N-d breakup cross section data at an incident proton energy of 13 MeV compared to 2NF predictions (light grey) and 3NF predictions (dark grey). (left) Theory curves by Kuroś-Żołnierczuk, *et al* compared to experimental cross-sections conducted at an incident neutron energy of 200 MeV from Pairsuwan, *et al.* (right)

J. Kuroś-Żołnierczuk et al. Phys. Rev. C, 66, 024004 (2002).
W. Pairsuwan et al., Phys. Rev. C 52, 2552 (1995).

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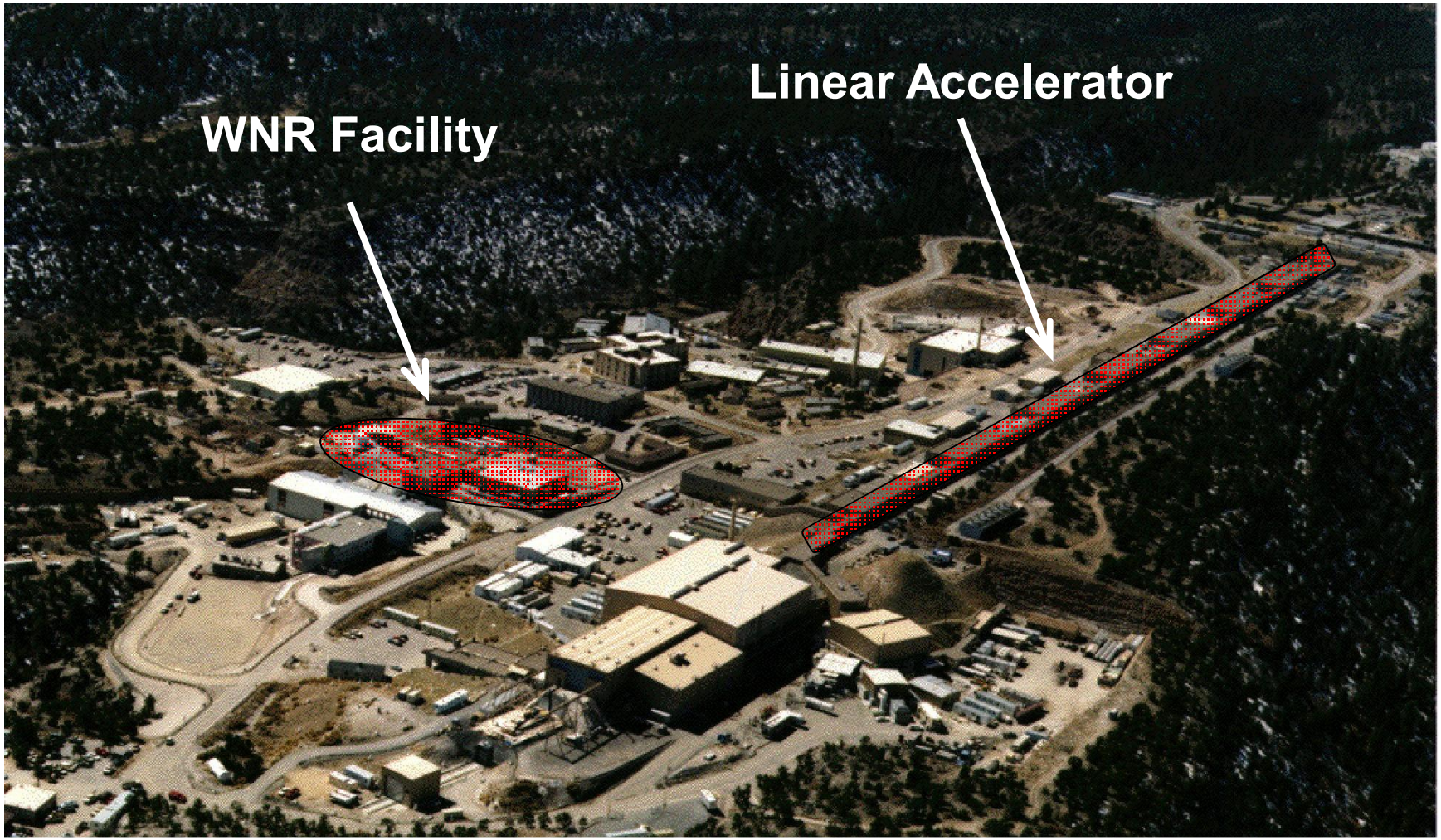
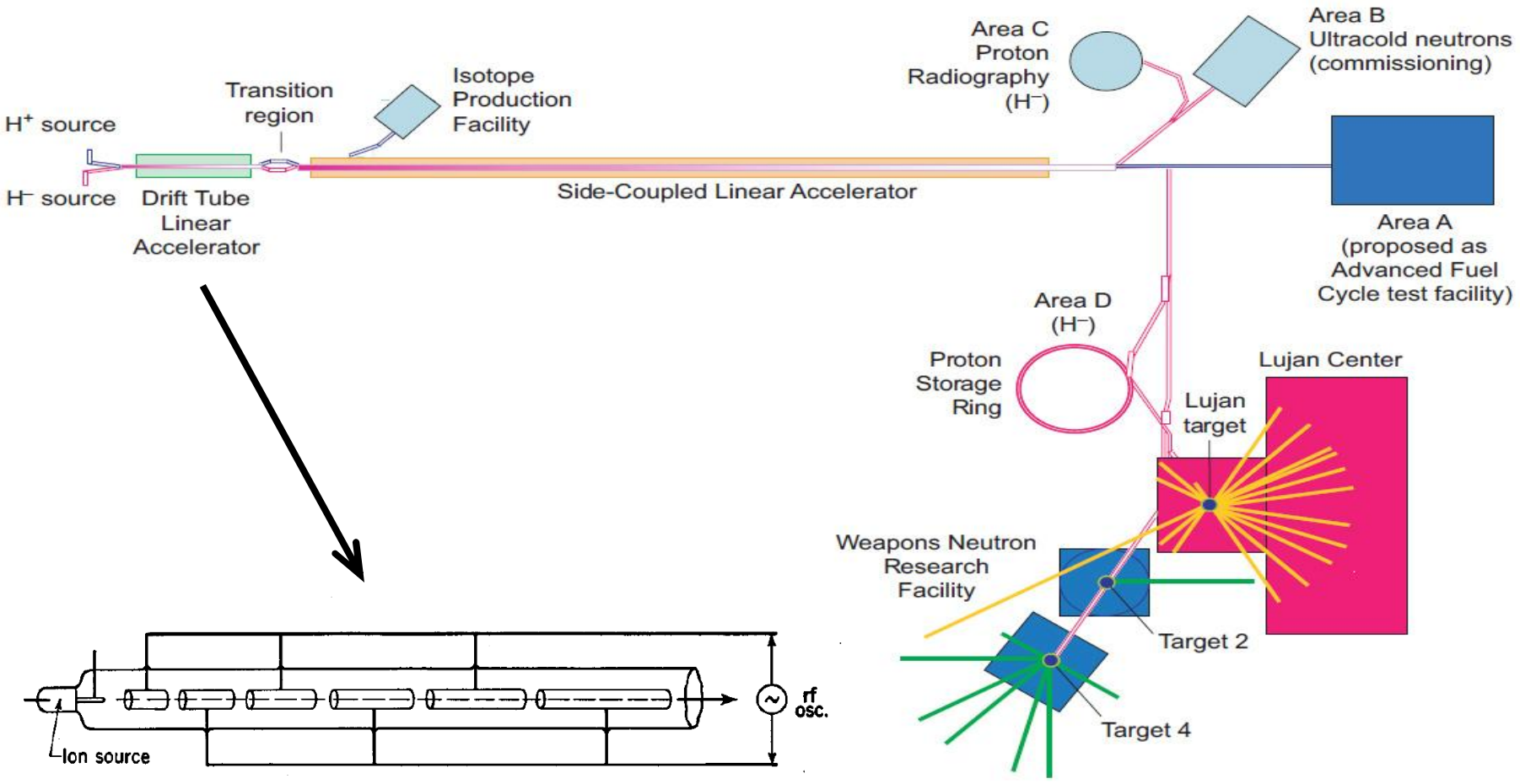
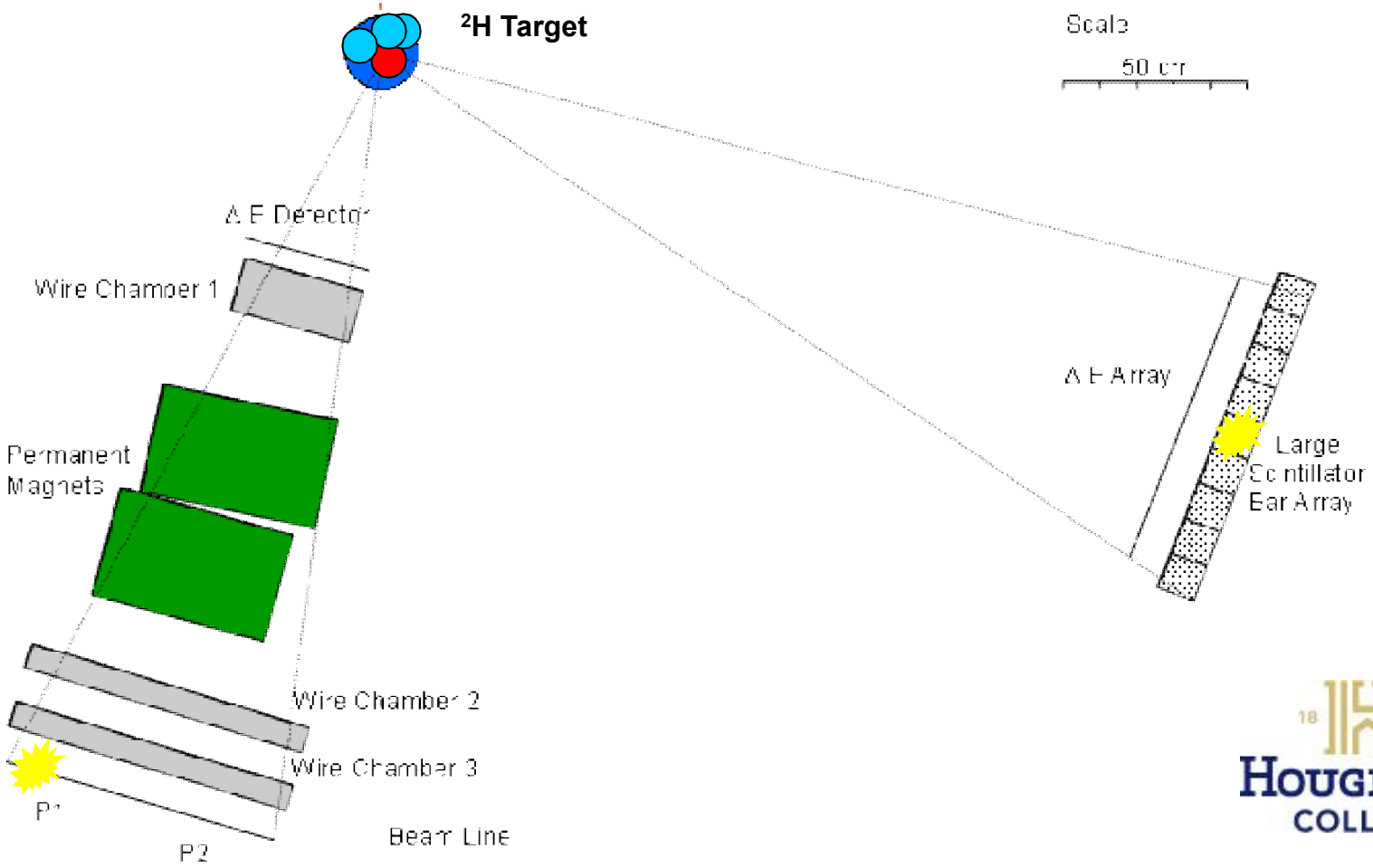
Los Alamos Neutron Science Center



Clinton B. Anderson Linear Accelerator



Experimental Setup



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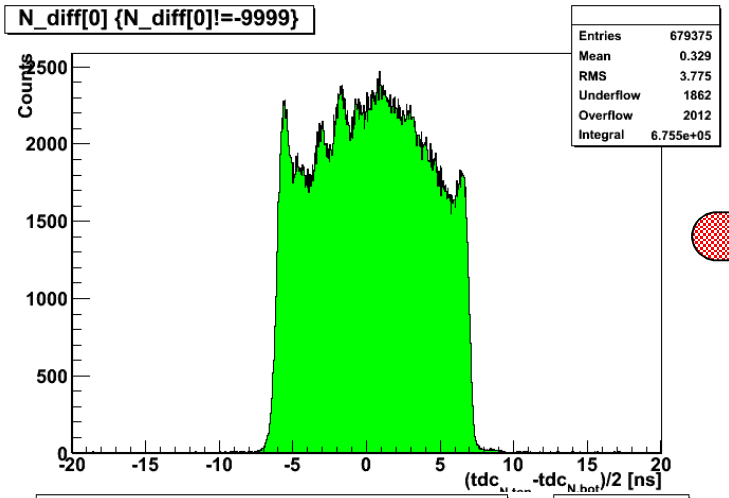
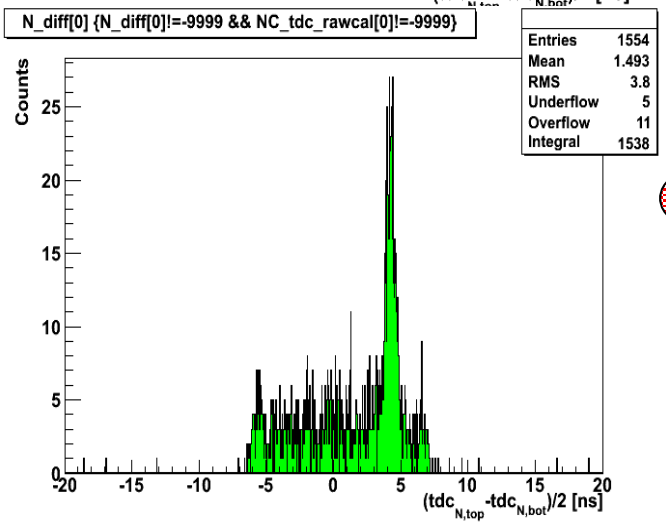
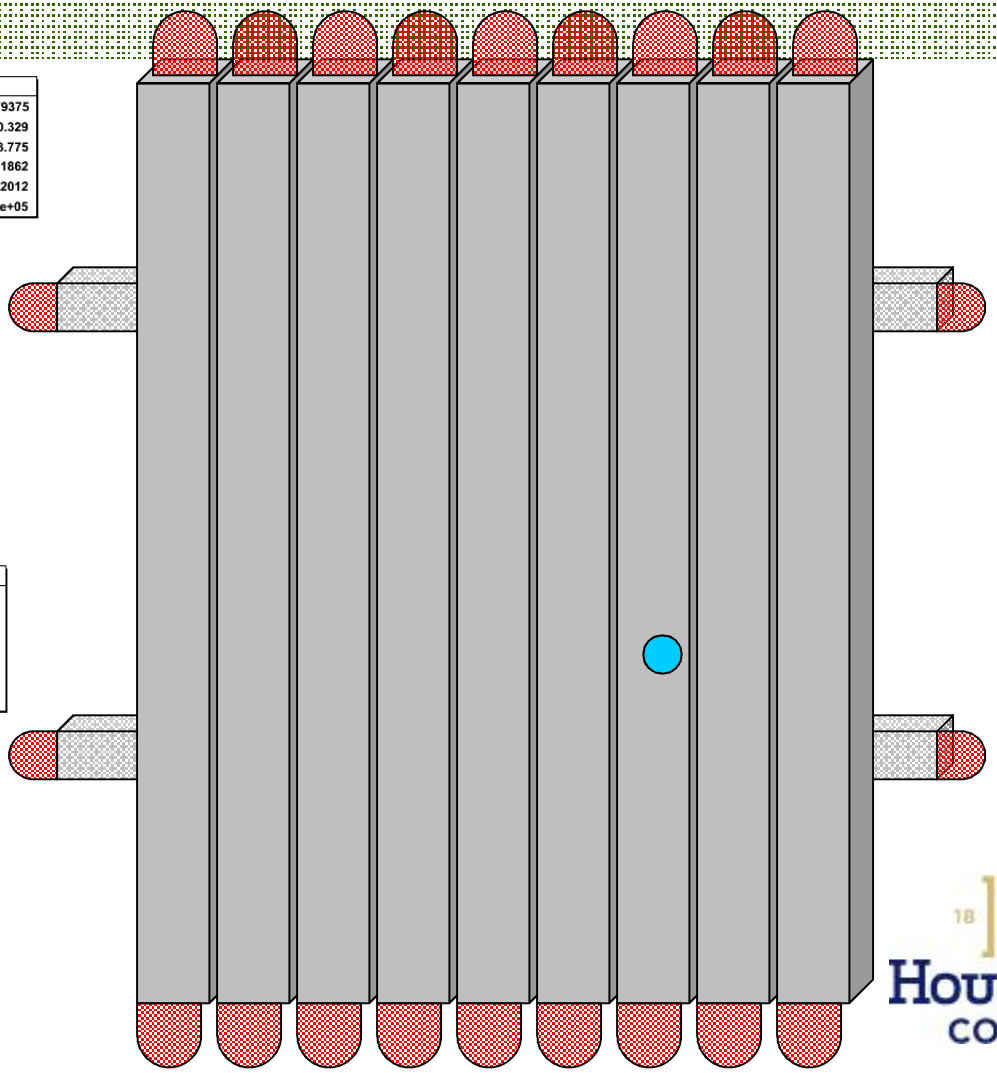
Neutron Detection







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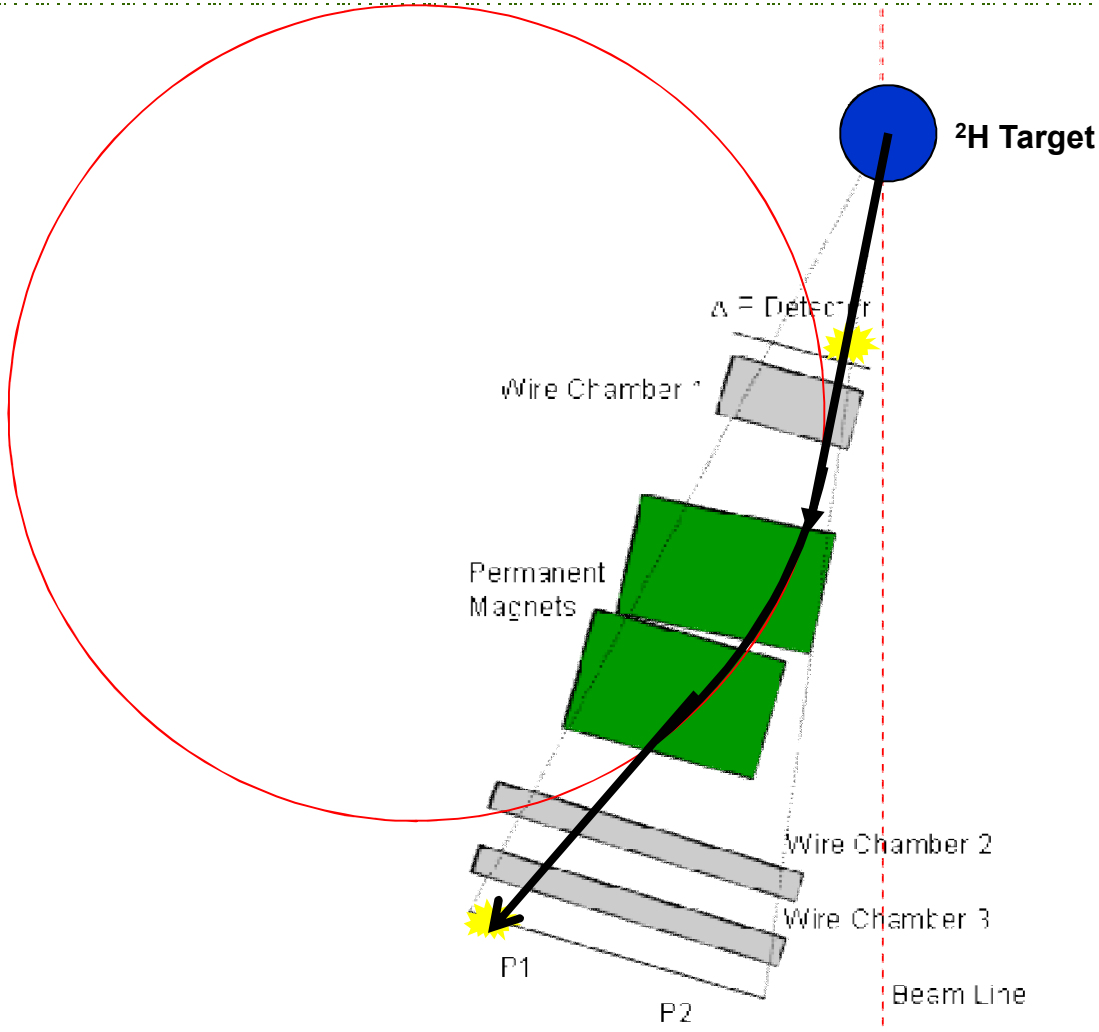
Neutron Detectio

Proton Track



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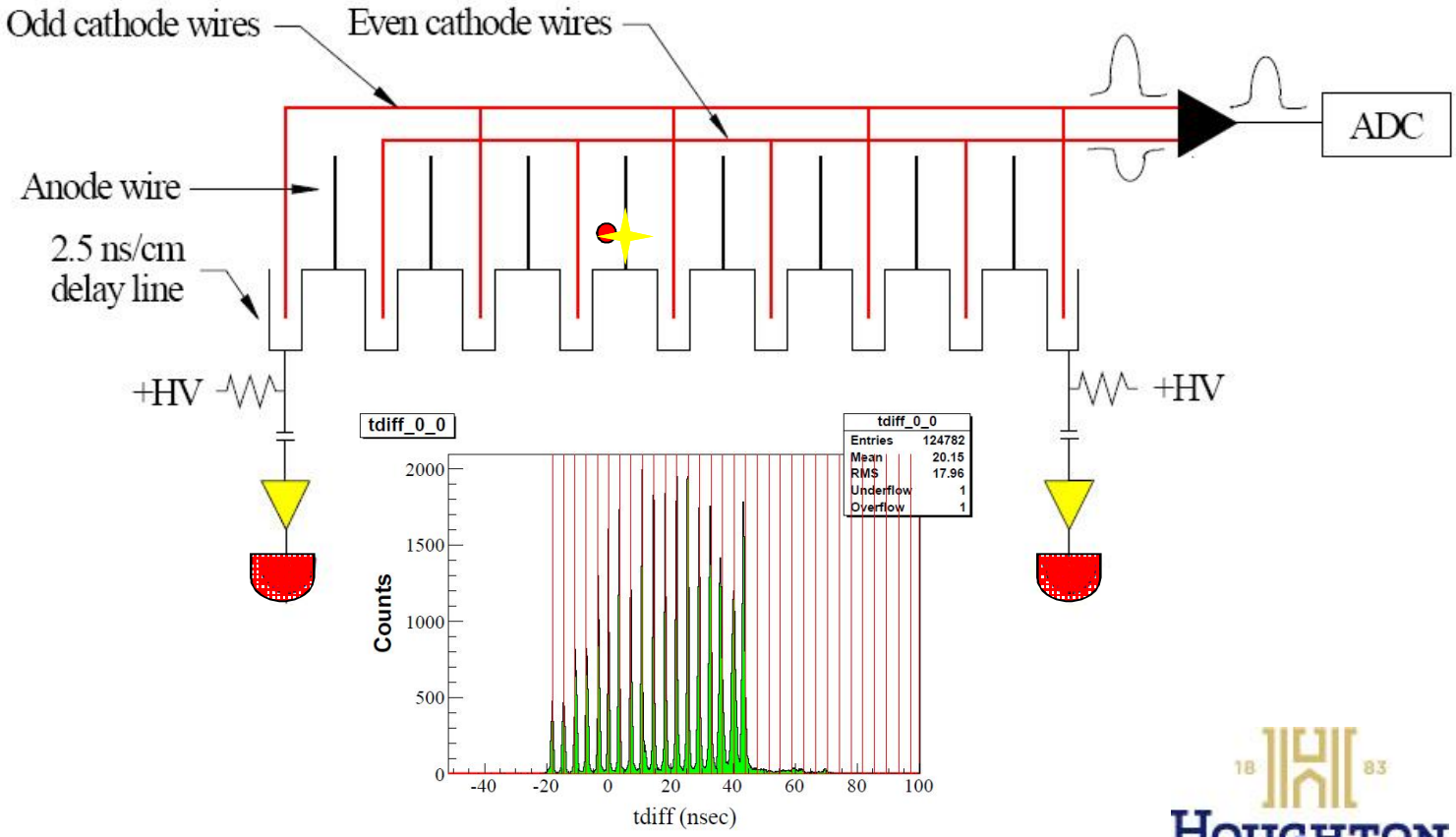
Wire Chamber



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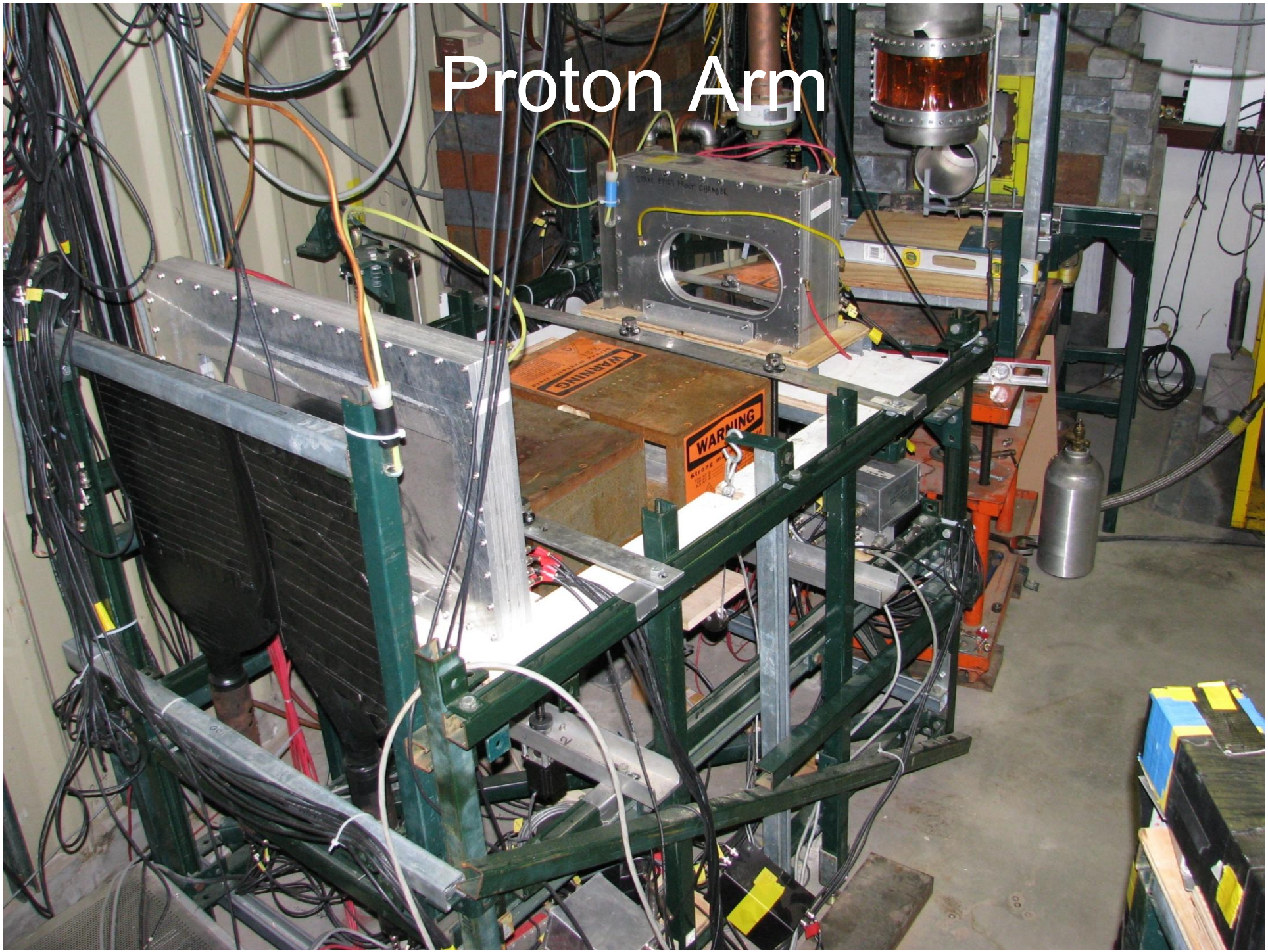
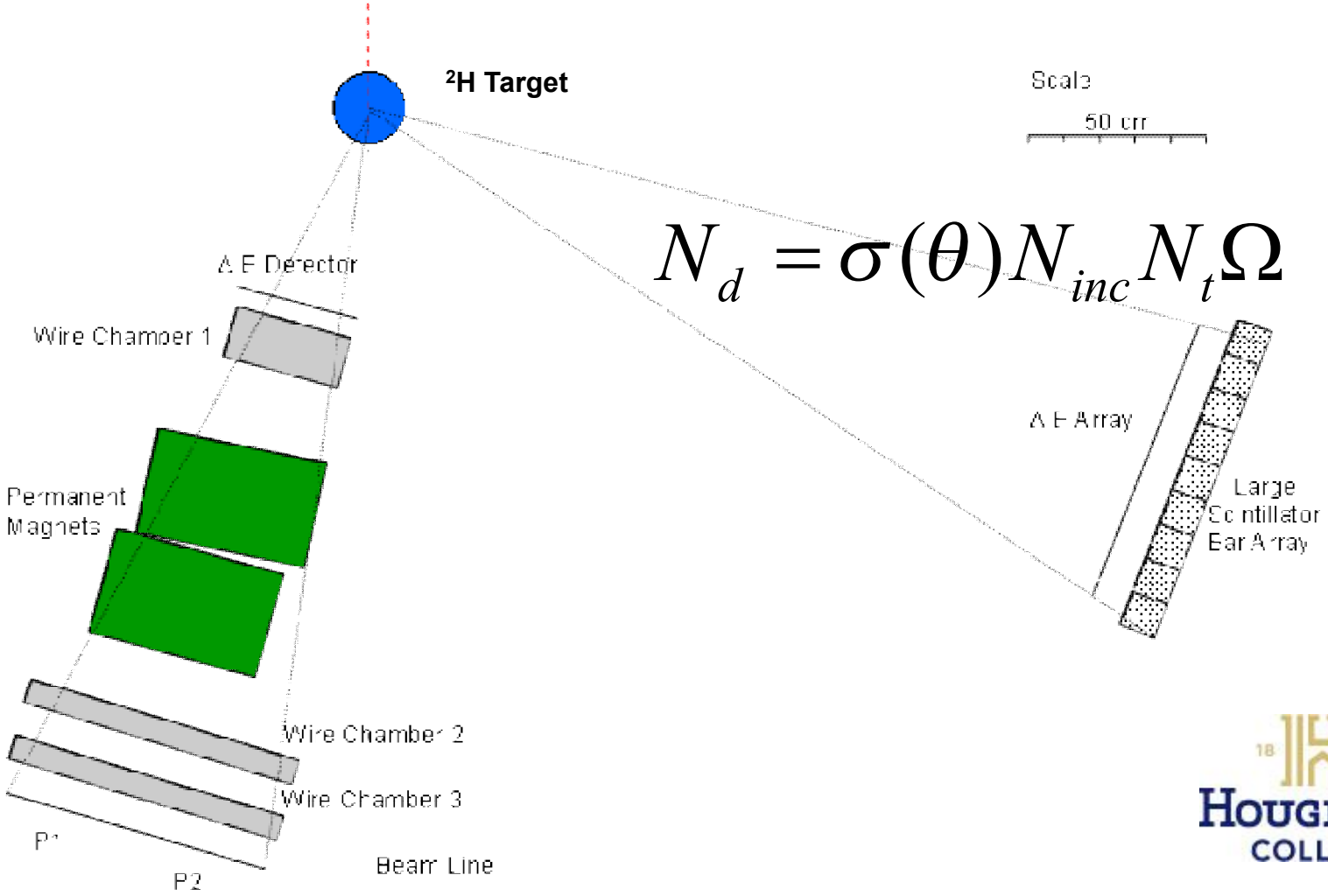
Proton Arm



Normalization and Analysis



$$N_d = \sigma(\theta) N_{inc} N_t \Omega$$

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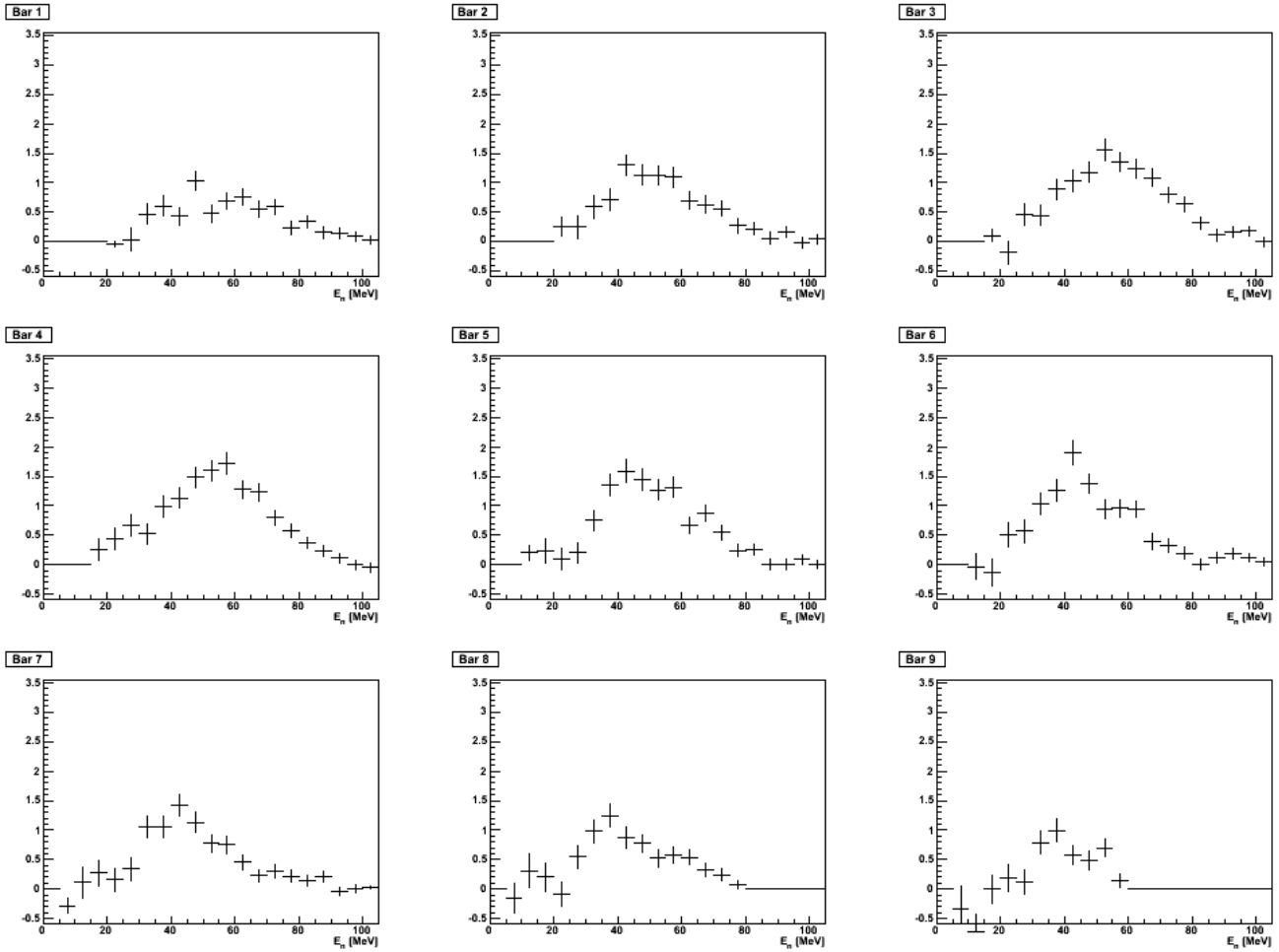
Cross Sections



Triple differential cross section with respect to p, n, and E_n in units of mb/MeV/sr^2 for E_{in} = 100 ±10 MeV.

S. Uemura. Bachelor's Thesis, Massachusetts Institute of Technology, (2010). (unpublished).

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Acknowledgments

- Collaboration:
  - MIT
  - University of Kentucky
  - Boğaziçi University
  - Los Alamos National Laboratory
- Advisor: Mark Yuly of Houghton College

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Questions?

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