# Deuteron Formation for Big Bang Nucleosynthesis Models

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# Outline

- Explanation of Facilities
- $n+p->d+\gamma$
- Big Bang Nucleosynthesis Model
- Experimental Setup and Preliminary Analysis

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Los Alamos Neutron Science Center
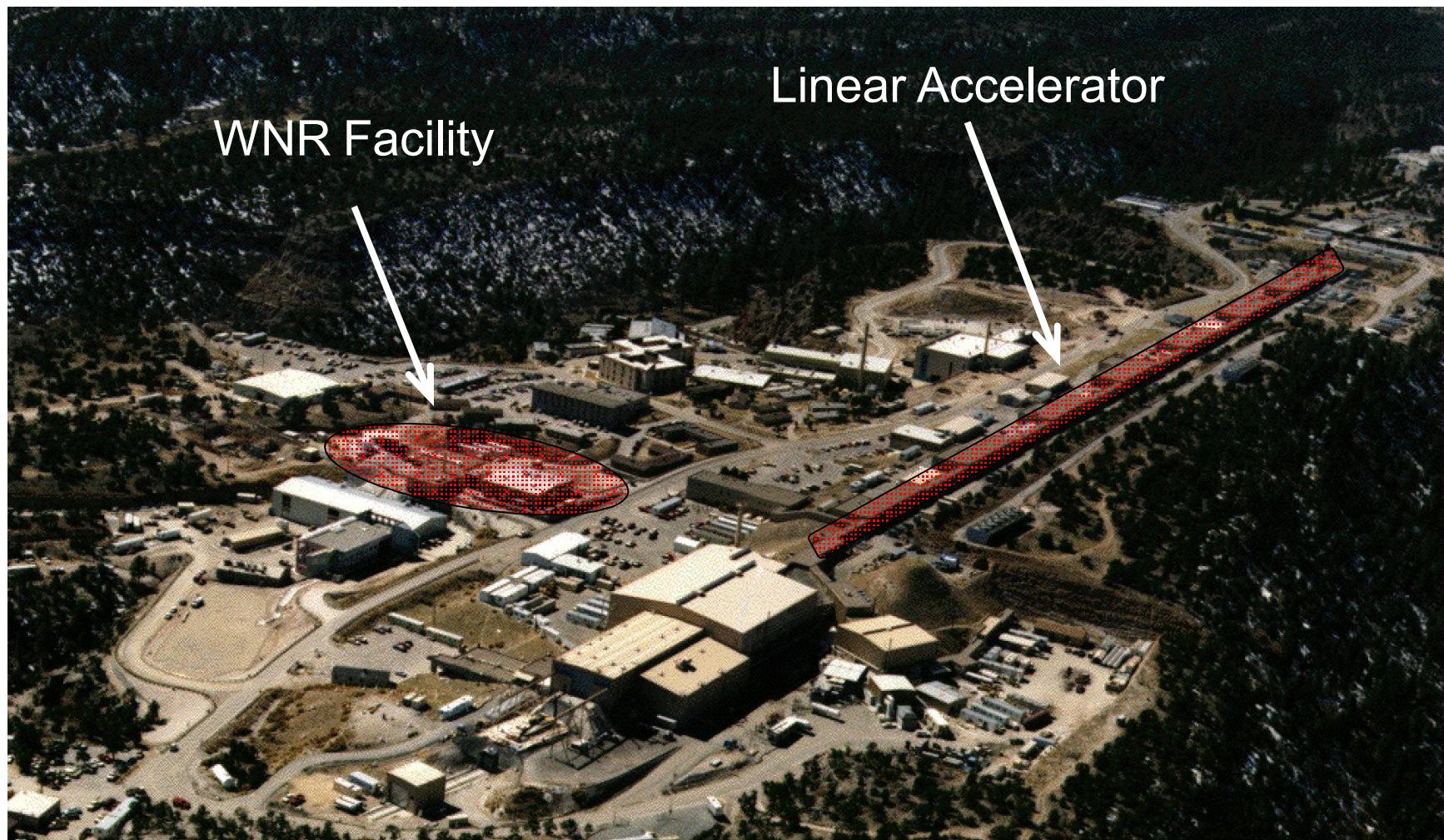
# Clinton B. Anderson Linear Accelerator

Beamline

Proton Beam

Spallation Target (Target 4)

FP90R

FP90L

GEANIE

FP60R

FP15R

FP30R

FIGARO

FP15R

FP30L

FP00

FP15L

Neutron Flight Path
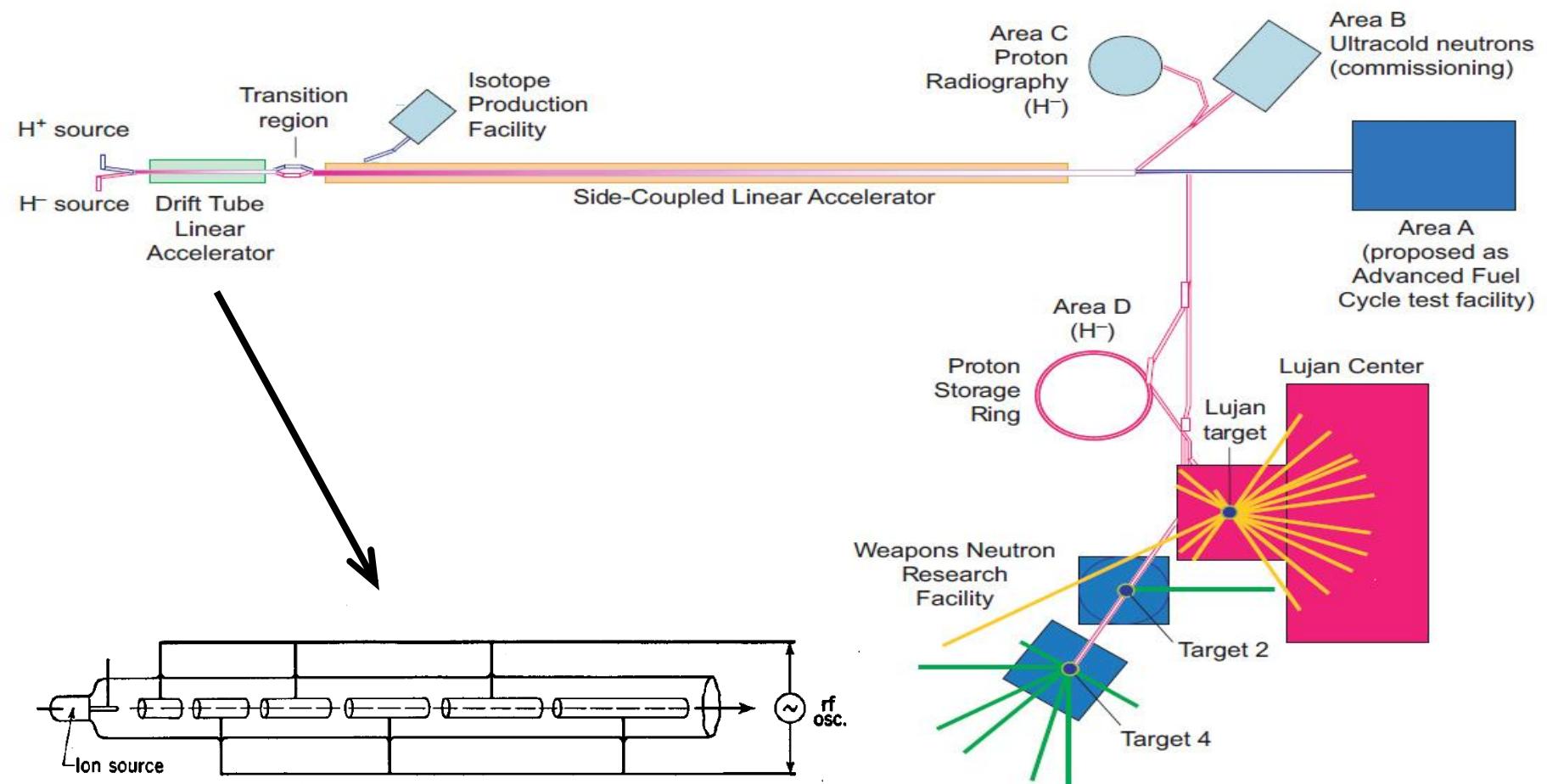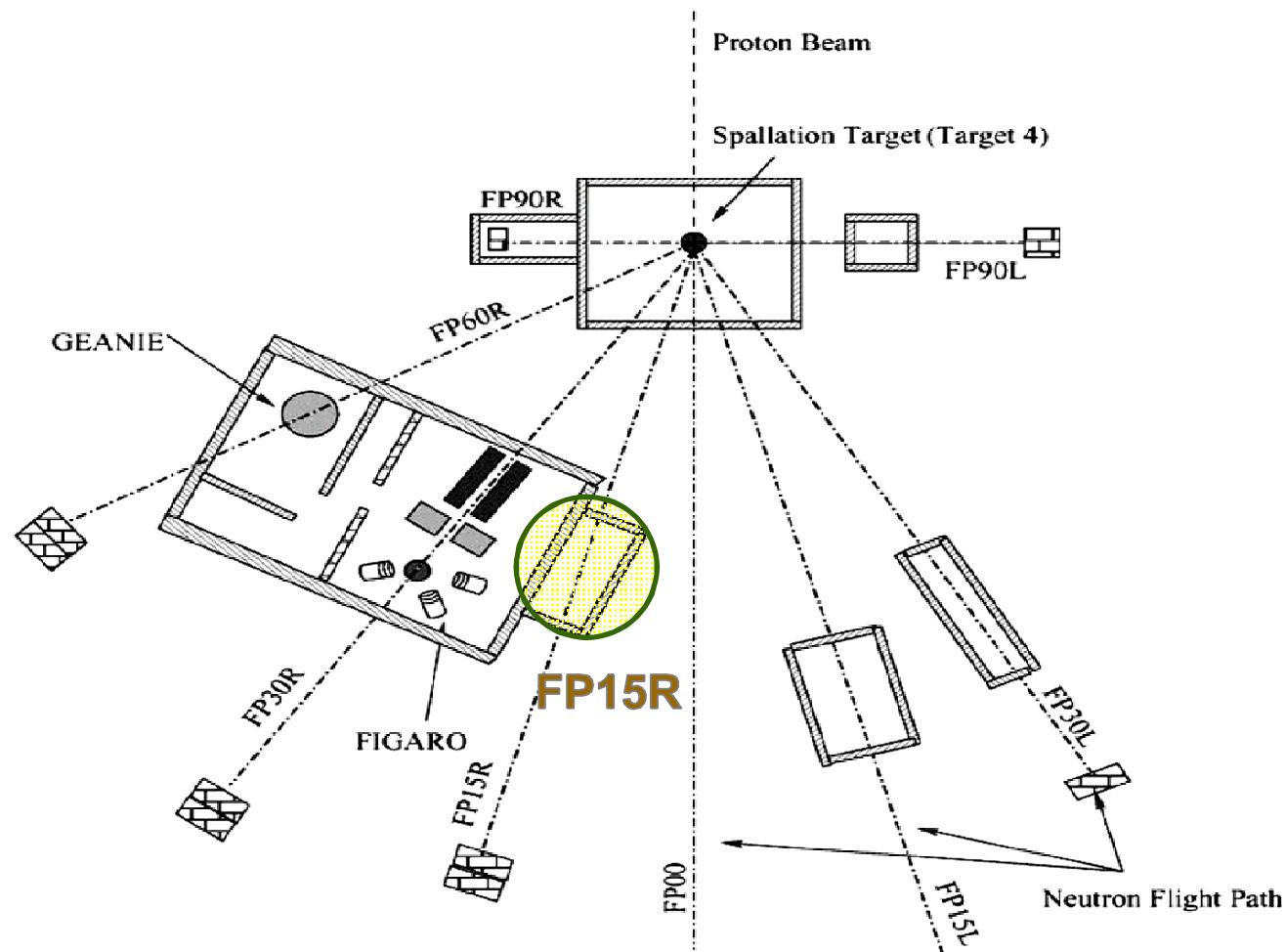
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$n + p \rightarrow d + \gamma$
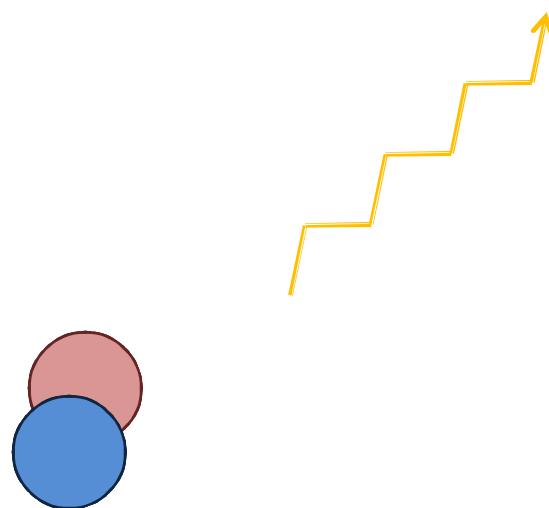
Cross Sections

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

Events Detected

Cross Section

Number of
Scattering Centers

Number of
Incident Particles

Solid Angle

N_d

dA

r

ϑ

N_{inc}

N_t
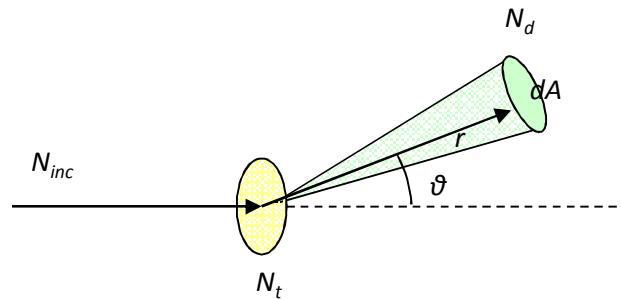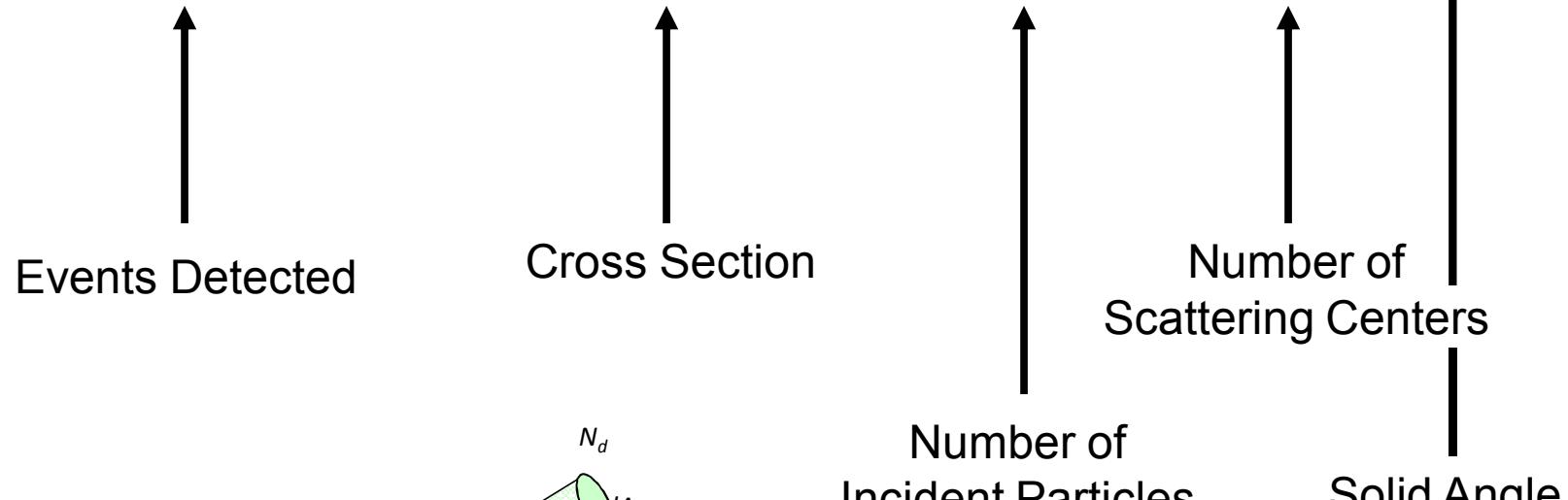
Big Bang Nucleosynthesis
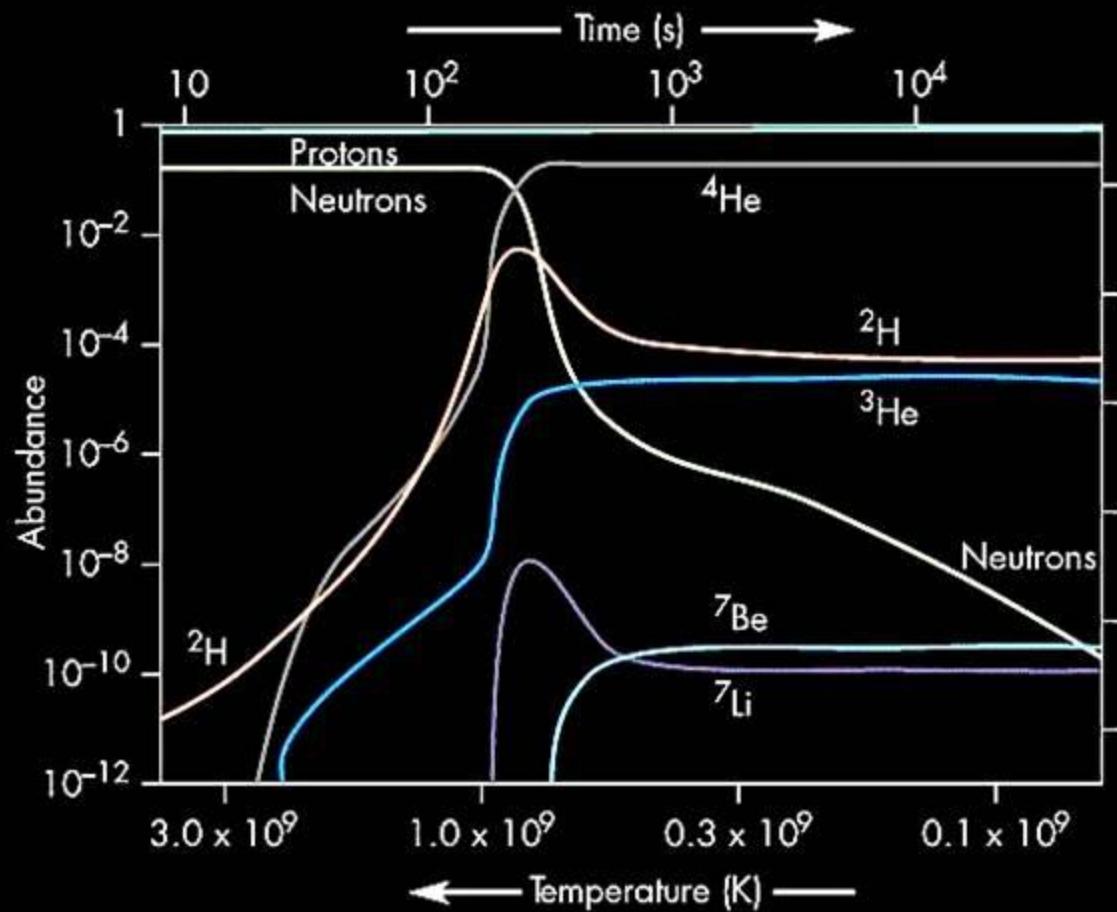
Motivation:
Previous Experiments
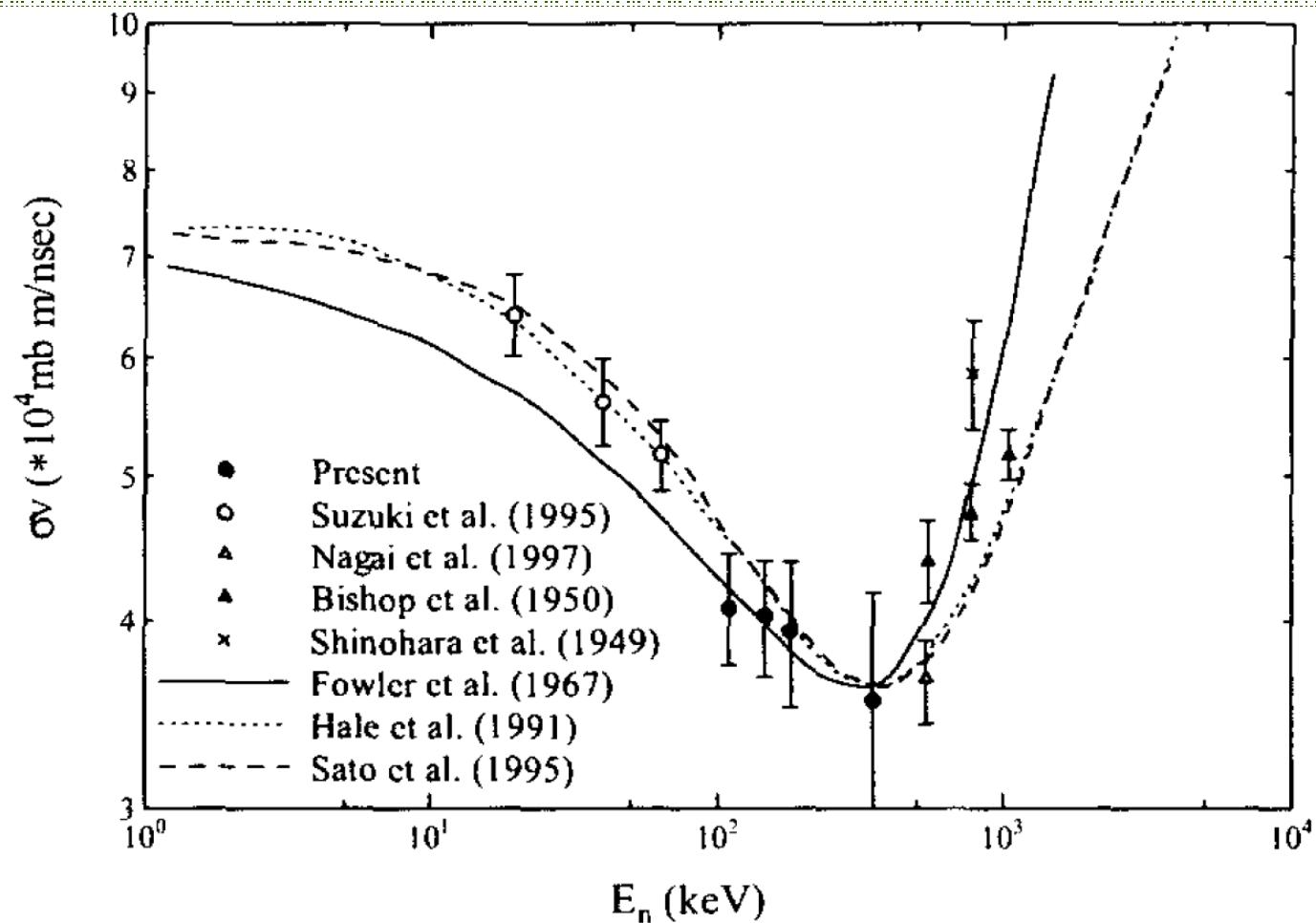
A. Tomyo et al., Nucl. Phys. A718, 401c (2003).

Experimental Setup

Fission Chamber

BrilLanCe

Active Target

Neutron Detector 2

Neutron Detector 1

Beam Axis
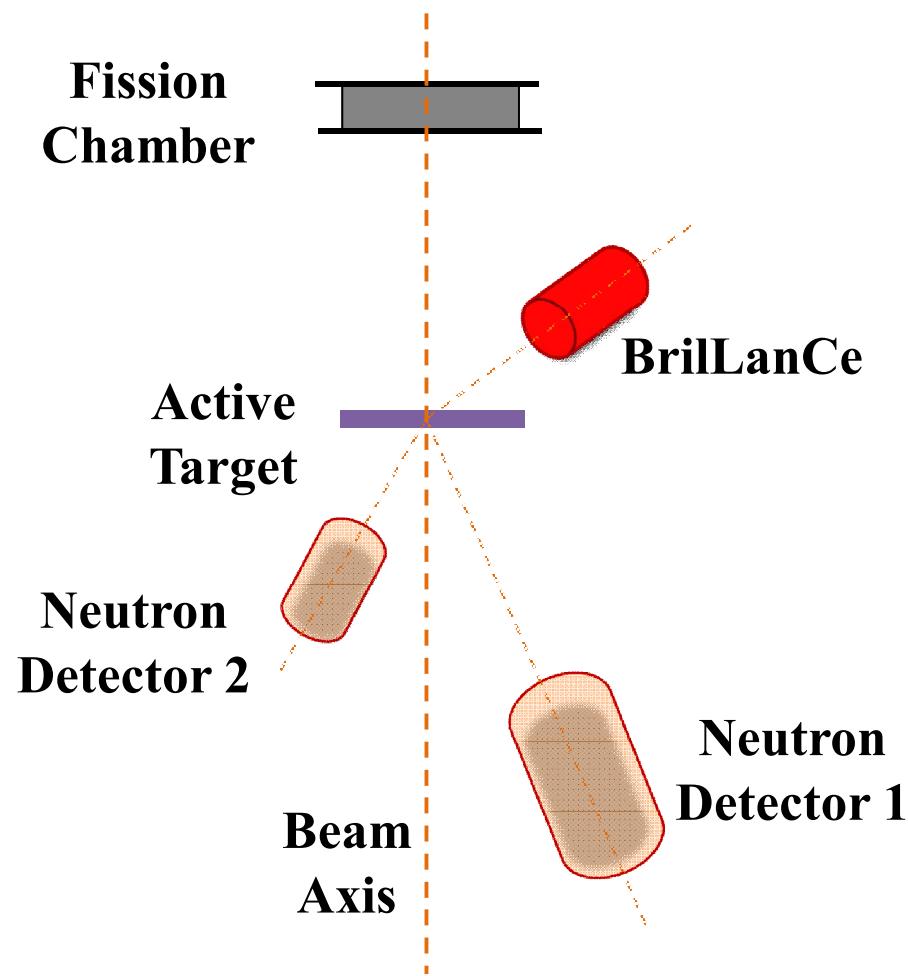
Experimental Setup
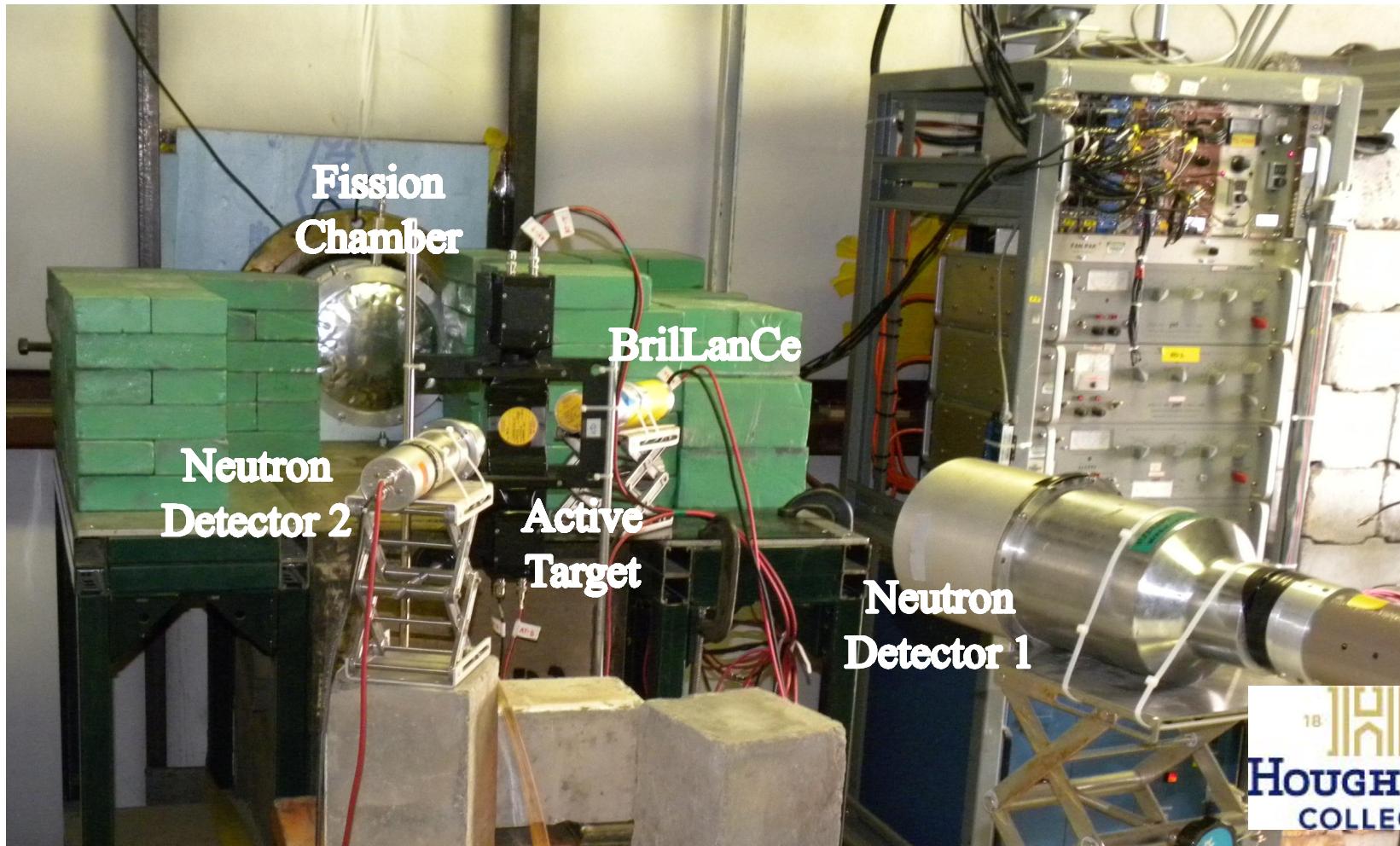
Innovative Electronics

npdg 2010
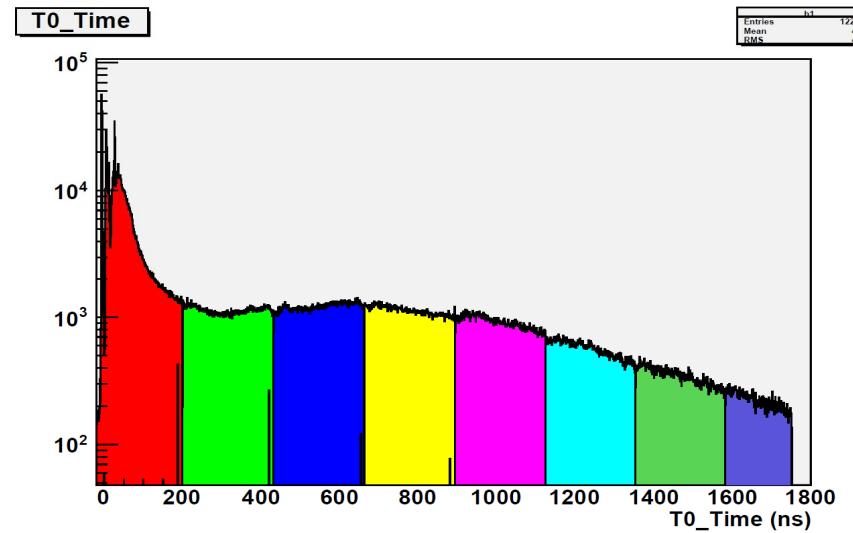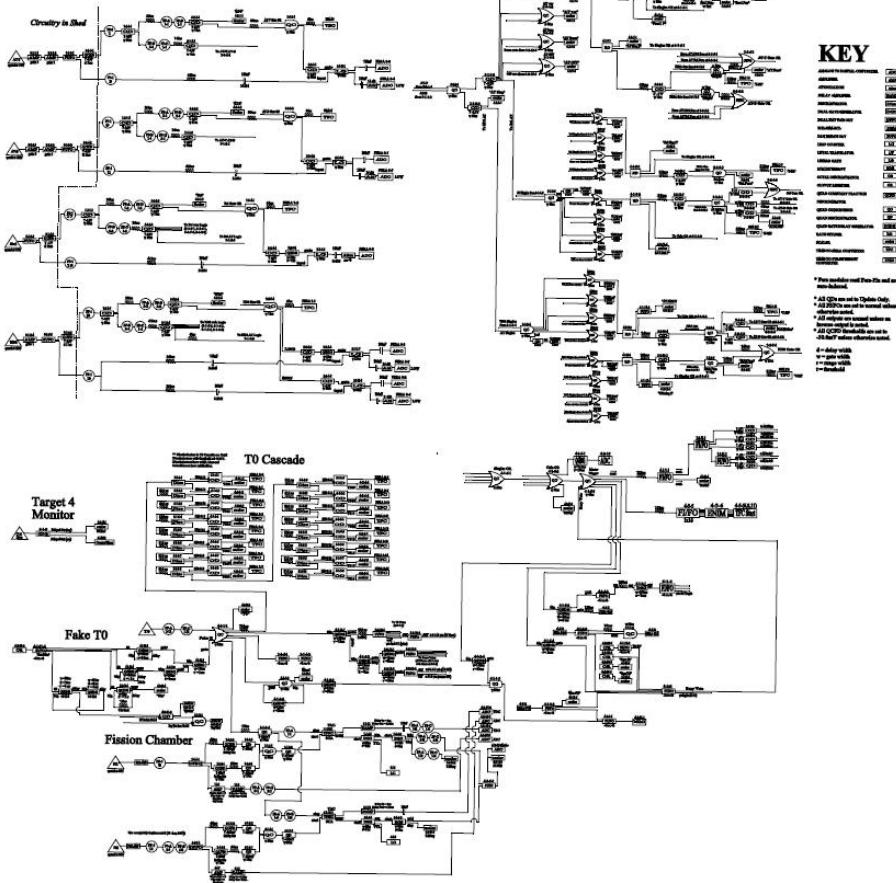
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- Digital gates

Preliminary Analysis

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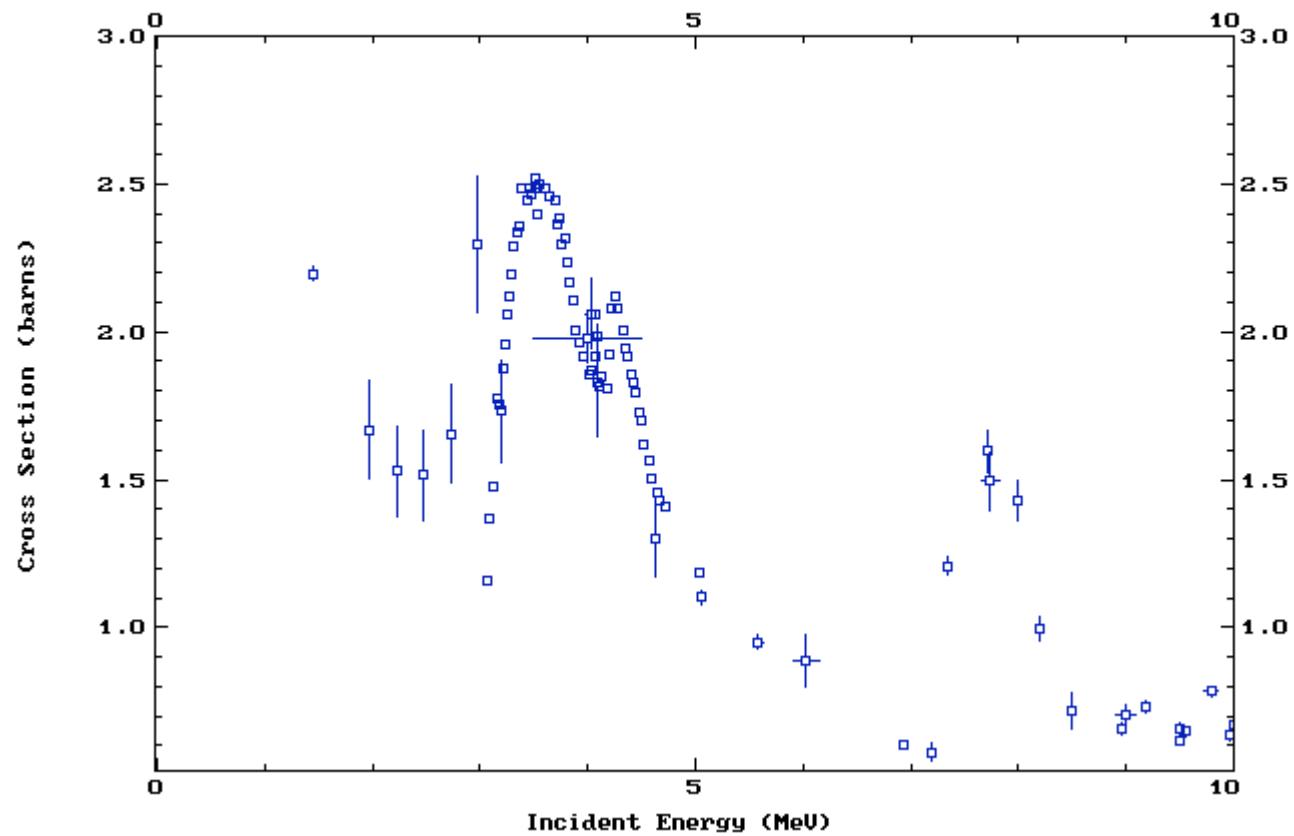
Acknowledgments

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  - Los Alamos National Laboratory
- Advisor: Mark Yuly of Houghton College

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Questions?