

Development of a Deuterated Neutron Detector Array for Nuclear (Astro)Physics Studies

Neutron-rich and neutrondeficient nuclei are at the forefront of research in nuclear structure, nuclear reactions and nuclear astrophysics. The advent of rare isotope beams (RIBs) has open a new door for studies of systems with very short half-lives and fascinating properties which impact the universe around us.

We are developing a state-of-theart neutron detector array that will perform allow us to highresolution neutron spectroscopy studies with stable and radioactive The neutron detection beams. system consists of 16 organic liquid scintillation detectors with a very fast response, capability to distinguish between neutron and interactions. gamma-ray and ability to extract the energy of the



Fig. 1.- Top: Design of one of the configurations of the neutron detector array. Bottom: Neutron detectors being tested at the lab.

For more information:

http://fsunuc.physics.fsu.edu

This novel design uses deuterated benzene (C_6D_6) as liquid scintillation medium. The asymmetric nature of the scattering between a neutron and a deuterium in the center of mass produce a pulse-height spectra from the deuterated scintillator which contain useful information on the initial energy of the neutron.



This summer we will perform our first measurement with the new neutron detector array. We expect to use it extensively at the John D. Fox nuclear laboratory at FSU and at other national facilities.

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