



Neutron irradiation station at the NSL

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ABSTRACT:

Accurate nuclear data is required in the design phases of selected reactor and fuel cycle concepts in order to reduce margins of risk for both economics and safety. At the moment, cross-section data for the most relevant and crucial neutron-induced reactions for the next generation nuclear reactors and new coolants (salt) are scarce and the majority of the measurements are decades old. In many cases, newer measurements are discrepant from the older experiments illustrating the need to reevaluate the existing data. This proposal fits into the NEUP workscope MS-NE-2: NUCLEAR DATA NEEDS FOR NUCLEAR ENERGY APPLICATIONS and will provide improvements in the nuclear data through enhancement of experimental capabilities that will result in new experimental cross section data for reactions critical to nuclear energy applications.

We propose to develop a neutron irradiation station (NIS) at the Nuclear Science Laboratory (NSL) at the University of Notre Dame (UND). This proposal will add new capabilities to the existing infrastructure of the NSL that is currently focused on ion-beam studies. The facility will fill a gap in the existing neutron-beam resources available in the country by providing a mono-energetic flux of neutrons in the energy range of a few keV to about a few MeV produced via (p,n) or (α ,n) reactions on low-Z target materials.

The development of NIS will enable:

Goal 1: Measurements of n-induced cross sections crucial for reactor designs and fuel cycle concepts.

Goal 2: Testing of thin actinide targets and ceramic fuels for new reactor designs.

Goal 3: Expansion of partnerships between the NSL and National Laboratories (NLs) in applications ranging from nuclear energy to stockpile stewardship and homeland security.