NEUP Nuclear Energy University Program
U.S. Department of Energy

Project Title Development of Neutron Tomography at the UWNR

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Program: University
Research Reactor Upgrades
Infrastructure Support

ABSTRACT:

Project Objective: The specific objective of this proposal is to enhance nuclear energy-related research and development at the University of Wisconsin Nuclear Reactor (UWNR) and associated Characterization Laboratory for Irradiated Materials (CLIM).

Project Description: This proposal seeks to enhance the neutron radiography capabilities at the reactor, by acquiring a high-resolution detector, rotation stage, visualization software and a high-performance computer. This proposal represents the first stage of our longer-term plan to establish tomographic neutron imaging (NI) capabilities to complement the X-ray imaging facility that was recently installed. NI techniques can be complementary to X-ray examination and play important and often crucial roles in characterization of materials. In particular, NI techniques such as Neutron Radiography (NR) and Neutron Computed Tomography (NCT) are well established and support a vibrant user community from academia, national labs, and industry.

Project Impact: Not only will this instrument enhance the on-going outreach and education activities of the UWNR, which reaches students of diverse backgrounds, it will expand access to neutron imaging by university researchers in the U.S. There is a clear need for neutron imaging at major U.S. facilities for a variety of applications such as: energy, materials science, geology, homeland security and contraband detection, biomedical and bioengineering, cultural heritage, physics and chemistry.

The proposed enhancement to nuclear energy-related research and development at the University of Wisconsin Nuclear Reactor (UWNR) and associated Characterization Laboratory for Irradiated Materials (CLIM) will directly support the educational and research capabilities in the following ways:

- Develop a new research tool for increasing the accessibility of neutron imaging to the community of university, national laboratory, and industry users
- Increase utilization and awareness of the UWNR
- Support research relevant to the DOE-NE mission through the DOE-NE funded programs
- Support technology development and technology transfer from government funded research to the market through collaboration with private industrial partners
- Develop a competent work force for the nuclear industry