

NUCLEAR ENERGY UNIVERSITY PROGRAMS

Advanced Elastic/Inelastic Nuclear Data Development Project

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Abstract

Fast reactor development requires high-precision nuclear data files for elastic/inelastic neutron scattering from fuel components, coolants, and structural materials. The relevant precision requirements, which support sensitivity analyses of potential fast reactor cores, establish a high-priority need for precision nuclear data far more stringent than what is available in current nuclear data evaluations and beyond current theoretical and experimental capabilities. The nuclear data files used in advanced fuel cycle codes are a culmination of the best available experimental data and nuclear theory, combined to provide not only the central values for nuclear cross sections but also their uncertainties.

In order to deliver these new high-precision nuclear data files and full covariant uncertainties, advances in basic nuclear theory must be made and supplemental experimental data measured and provided to complete the picture. This project will develop a novel, yet practical, approach to deliver the nuclear data that address required elastic and inelastic cross section data needs. The project team includes nuclear theorists and modelers, detector development experts, and experienced experimentalists—with access to a variety of neutron facilities for measurements, development, and testing.