NE-26-39291 Design-Enabling Nuclear Data Evaluation

OrganiCore Nuclear, Inc., located in New York, NY, is developing an innovative small modular reactor (SMR) that employs low-pressure organic cooling, separate water moderation, and commercially available LEU fuel to enable rapid deployment and achieve large light-water reactor economics at microreactor scale. High-fidelity nuclear data, particularly Thermal Scattering Law (TSL) data describing low-energy neutron interactions—are essential for accurate reactor physics modeling, safety analysis, and licensing. However, no evaluated TSL data currently exist for the organic coolants used in the OrganiCore design.

OrganiCore will partner with ORNL to leverage its Spallation Neutron Source (SNS), machine-learning-enabled molecular dynamics capabilities, and prior successful TSL validation work for reactor materials to generate and validate the required nuclear data. The project will create critical-path nuclear data needed to support the design, safety analysis, and licensing of organic-cooled small modular reactors (SMRs).

This project will address a major gap in high-fidelity nuclear data for advanced reactors, specifically the lack of validated TSL data for organic coolants used in OrganiCore's organic-cooled SMR concept. The project aims to develop experimentally validated TSL data for proprietary organic coolant materials to enable accurate reactor modeling and safety analysis.