NE-26-37871 Modeling of Realistic Spatially Resolved 3D TRISO Particles in Compact

BWXT Advanced Technologies (AT) is located in Lynchburg, Virginia. Its mission is to deliver innovative nuclear solutions to create a better world. They build the systems that power the U.S. Navy's submarine and aircraft carrier fleet; restore the natural environment and government at nuclear sites; and supply the components and fuel for clean energy to power homes and businesses around the world. BWXT is also the foremost producer of TRi-structural ISOtropic (TRISO) nuclear particle fuel.

Currently, AT's fuel qualification Evaluation Model (EM) code capabilities are limited to the assessment and optimization of single TRISO particles. The inability to practically model 3D particle–particle and particle–matrix interactions across a compact is needed for the BWXT Advanced Nuclear Reactor (BANR) fuel qualification and Nuclear Regulatory Commission (NRC) evaluation model requirements.

Idaho National Laboratory (INL) has developed state-of-the-art modeling and simulation tools for advanced TRISO particle-based fuels using BISON code. AT will partner with INL to extend the BISON fuel-performance code so it can practically model 3D TRISO particle distributions in UCO TRISO compacts, capturing particle–particle and particle–matrix interactions needed for supporting commercial operations of BWXT's TRISO fuel for the nuclear industry.