Improvements of Nuclear Data Evaluations for Lead Isotopes in Support of Next Generation Lead-Cooled Fast Systems

PI: Yaron Danon, Rensselaer Polytechnic Institute
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Collaborators: David Brown, Brookhaven national Laboratory

Devin Barry, Naval Nuclear Laboratory

ABSTRACT:

Recently there is an increased commercial interest in lead-cooled fast reactor (LFR) systems because of their higher operation temperature which increases the thermodynamic efficiency, and reduces nuclear waste. Several commercial vendors are working to develop LFRs and related technologies and require accurate nuclear data in the fast and intermediate energy region. Sensitivity calculations indicated that the uncertainty in the nuclear data of lead isotopes propagate to uncertainties in the calculated multiplication factor, coolant void worth, and safety margins. The objective of this project is to improve the accuracy of neutronics simulation of lead based systems by improving the nuclear data of lead isotopes. The nuclear data for lead will be reevaluated with emphasis of the intermediate and fast energy regions that are required by reactor applications currently sought by several industrial entities. The deliverables of this project are new lead isotopes evaluations that will be candidates for inclusion in a future ENDF library reslease.