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Title: DT-based Neutron Resonance Transmission Analysis for Nuclear Security Applications

Abstract

Neutron resonance transmission analysis (NRTA) is an isotopically sensitive, nondestructive assay technique that has previously been used for isotopic identification and quantification. Traditional NRTA experiments have required a high neutron source intensity and fine time resolution only achievable at large-scale user facilities, precluding the use of NRTA for applications requiring on-site analysis. Previous work from this group has demonstrated the feasibility of using a portable D-T neutron generator for isotopic identification of mid- and high-Z elemental targets with neutron resonances in the energy range of 1–50 eV. This talk will present experimental results for NRTA measurements of shielded and unshielded depleted uranium targets and MCNP simulations for analyzing LEU and HEU targets. The potential feasibility of using the compact DT-based NRTA setup for nuclear safeguards and treaty verification inspections will also be discussed.