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Overview of the Gamma Rays Induced by Neutrons (GRIN) Project

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Active interrogation (AI) with neutrons is an important tool for nuclear security and nonproliferation applications, as well as for fossil fuel and space exploration. The backbone of this technique is a pattern of emitted gamma-rays which provide a distinct isotopic "fingerprint"of the material being interrogated. We aim to support AI by improving traditional and event-by-event simulation tools that can model particle-gamma and gamma-gamma coincidences. The Gamma Rays Induced by Neutrons (GRIN) project was established to improve the data supporting AI in the ENDF/B library. The GRIN project has developed improved (n, n') outgoing gamma data by synchronizing ENDF/B files with authoritative sources such as ENSDF and is developing improved methods and evaluations for outgoing gamma data from (n, g) reactions. These evaluations rely on new capabilities in the Generalised Nuclear Database Structure (GNDS) format. The GRIN project has also drafted a gap analysis detailing shortcomings in the ENDF/B-VIII.0 library. Finally, the GRIN project is adapting the Monte Carlo event generator MCGIDI to use our new evaluations in radiation transport calculations.

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