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Improved Capture Gamma-Ray Libraries for Nuclear Applications¹ BRAD SLEAFORD, Lawrence Livermore National Laboratory, RICHARD FIRESTONE, Lawrence Berkeley Laboratory, NEIL SUM-MERS, JUTTA ESCHER, Lawrence Livermore National Laboratory — The neutron capture reaction is of fundamental use in identifying and analyzing the gamma-ray spectrum from an unknown object as it gives unambiguous information on which isotopes are absorbing the neutrons. There are known data gaps in the ENDF libraries used by transport codes which are critical to various nuclear applications. The Evaluated Gamma-ray Activation file (EGAF) is a new thermal neutron capture database of discrete line spectra and cross sections for over 260 isotopes. This database is used to improve the capture gamma production in ENDF libraries. For medium to heavy nuclei the unresolved quasi continuum part of the gamma cascades are not experimentally available. This continuum can contain up to 90% of all the decay energy, in this work it is modeled with the statistical nuclear structure code Dicebox. We plan to continue the Dicebox approach through the resolved resonance region where spin and parity information is partially known. At higher energies to 20 MeV we are applying Hauser Feshbach models to predict the cross sections of gamma spectra to improve the neutron data libraries used for transport modeling of unknown objects.

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Brad Sleaford Lawrence Livermore National Laboratory

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