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Neutron induced reactions of ^{150}Sm and influence of spin distribution in the pre-equilibrium process[1] D. DASHDORJ, G.E. MITCHELL, NCSU/TUNL, U. AGVAANLUVSAN, J.A. BECKER, J.R. COOPER, P.E. GARRETT, C.Y. WU, W. YOUNES, LLNL, T. KAWANO, M. CHADWICK, M. DEVLIN, N. FOTIADES, R.O. NELSON, LANL — Cross-section measurements were made of prompt γ-ray production as a function of incident neutron energy (E_n = 1 to 35 MeV) on an enriched (95.6%) ^{150}Sm sample. Energetic neutrons were delivered by the Los Alamos National Laboratory spallation neutron source located at the Los Alamos Neutron Science Center facility. The prompt-reaction γ rays were detected with the large-scale Compton-suppressed Germanium Array for Neutron Induced Excitations (GEANIE). Neutron energies were determined by the time-of-flight technique. The preequilibrium reaction process is important at high energies. The spin distribution transferred in preequilibrium neutron-induced reactions was calculated using the quantum mechanical theory of Feshbach, Kerman, and Koonin (FKK). These preequilibrium spin distributions were incorporated into a new version of the Hauser-Feshbach statistical reaction code GNASH and the γ-ray production cross sections were calculated and compared with experimental data. The difference in the partial γ-ray cross sections using spin distributions with and without preequilibrium effects will be discussed.

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