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Spin distribution effects in neutron induced preequilibrium reactions¹ D. DASHDORJ, NCSU/LLNL, G.E. MITCHELL, NCSU/TUNL, P.E. GARRETT, J.A. BECKER, U. AGVAANLUVSAN, R.A. MACRI, W. YOUNES, LLNL, T. KAWANO, M. CHADWICK, M. DEVLIN, N. FOTIADES, R.O. NELSON, LANL — The preequilibrium reaction (PE) mechanism makes an important contribution to neutron induced reactions above about 10 MeV. PE has been studied exclusively via the characteristic high energy neutrons. We are expanding the study of PE through γ ray spectroscopy. Cross sections of partial γ rays following the neutron induced reaction on ^{48}Ti for $E_n = 1$ to 200 MeV have been obtained in an experiment using GEANIE array at LANSCE/WNR. Using the GNASH reaction code the effect of the spin distribution of the residual nucleus in preequilibrium reactions has been investigated. The preequilibrium reaction spin distribution was calculated using the quantum mechanical theory of Feshbach, Kerman, and Koonin (FKK). The FKK preequilibrium spin distribution was incorporated into the GNASH calculations 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 is found to be significant.

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