
VALIDATION OF THE MONTE CARLO PRE-EQUILIBRIUM MODULE HMS

Mike Herman¹, Pavel Oblozinsky¹, Mark B. Chadwick²

¹ *Brookhaven National Laboratory*

² *Los Alamos National Laboratory*

The HMS preequilibrium module has been benchmarked in the extensive calculations of (N, N) spectra compared against experimental data. Angle integrated spectra of neutron and protons were calculated with EMPIRE-2.19 code for selected targets using (i) pure Hauser-Feshbach (HF) model and (ii) combined HF and HMS approach. Comparison with the compound nucleus results (HF) was essential for observing actual effect of the preequilibrium emission and screening the results for deficiencies due to the parameterization of the statistical part rather than to the HMS model itself.

The preequilibrium yields in the HMS model are governed by the damping rate, which can be adjusted (by k-factor) to fit experimental data. In the present analysis we have found no need for such an adjustment on a global scale. The mass and incident energy dependence of the HMS predicted nucleon emission was found to be correct. The encountered discrepancies, in most cases, can be ascribed to the oversimplified global parameterization of the Hauser-Feshbach component. The only potential deficiency in the HMS model is the over-prediction of the emission in the charge exchange channels.

We conclude that damping width as calculated in the HMS model is correct and does not need any modification on a global scale. In particular cases minor adjustment of the k-factor may improve performance of the model.