Abstract Submitted for the DNP19 Meeting of The American Physical Society

Sensitivity of FREYA to model inputs in simulations of 252Cf(sf)¹ RAMONA VOGT, Lawrence Livermore Natl Lab, JORGEN RANDRUP, Lawrence Berkeley National Lab, PATRICK TALOU, Los Alamos National Laboratory Employing the complete fission event generator FREYA, we study the sensitivity of neutron observables to the input yield function Y(A, Z, TKE) [1]. We first perform a statistical analysis of the available fission data to determine the distribution of possible yield functions and construct an ensemble of 15,000 such yield functions. For each of these, FREYA is used to generate one million fission events, leading to a corresponding ensemble of fission observables, including the neutron multiplicity distribution and its factorial moments, the neutron energy spectrum, and the neutron-neutron angular correlation. Thus we can study the sensitivity of those neutron observables to the uncertainty in the input yields. Particular attention is given to the anti-correlation between the mean neutron multiplicity $\overline{\nu}$ and the mean total fragment kinetic energy TKE. Because $\overline{\nu}$ is very well determined, we employ this anti-correlation to derive a significantly stricter tolerance on TKE. We also study the sensitivity to the FREYA input parameters.

[1] J. Randrup, P. Talou and R. Vogt, Phys. Rev. C 99, 054619 (2019).

¹This work was performed under the auspices of the U.S. Department of Energy under Contracts DE-AC52-07NA27344 (R.V.), DE-AC02-05CH11231 (J.R.) and DE-AC52-06NA25396 (P.T.)

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Date submitted: 24 Jun 2019

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