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Cross Sections for Neutron Induced Reactions from Surrogate Measurements: Revisiting the Weisskopf-Ewing Approximation[1] OLIVER GORTON, San Diego State University, JUTTA ESCHER, Lawrence Livermore National Laboratory — With increased use of surrogate nuclear reactions as an indirect method to determine compound-nuclear reaction cross sections, it is important to adjudicate the theoretical methods involved. Previous work has shown that a common approximation method has varying accuracy depending on the exit channel of the reaction. The Weisskopf-Ewing approximation, which is based on the assumption that the decay of the compound nucleus does not depend on whether it is produced via a surrogate reaction or via fusion of the projectile with the target of interest, greatly simplifies the extraction of the desired cross section. For surrogate measurements of neutron-capture cross sections, the results can differ significantly from the true cross section, while for fission the results are comparable. In this work, the prospects for determining one- and two-neutron emission cross sections are investigated. A nuclear reaction model is used to simulate quantities which are typically measured in a surrogate experiment. These simulated values are then used to assess the validity of the Weisskopf-Ewing approximation. The expected accuracy of this approximation method, if applied to fast-neutron induced reactions, is discussed and the limitations are illustrated.

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