

Abstract Submitted  
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**Low-energy neutron capture reactions via the surrogate method<sup>1</sup>**

JUTTA ESCHER, JASON BURKE, FRANK DIETRICH, JO RESSLER, NICHOLAS SCIELZO, IAN THOMPSON, Lawrence Livermore National Laboratory — Indirect methods, such as the surrogate approach, play a crucial role in determining cross sections for reactions on unstable nuclei. In a surrogate experiment, the compound nucleus of interest is produced using a light-ion direct reaction on a target that is easier to produce. The decay of the compound nucleus is measured in coincidence with the outgoing direct-reaction particle and the coincidence probabilities are used to infer the desired cross sections. The method is expected to play an important role in cross-section measurements with radioactive ion beams (RIBs), since inverse-kinematics experiments cannot be performed on a neutron target. For example, if one measures  $(d,p\gamma)$  instead of  $(n,\gamma)$ , one carries out a surrogate measurement. To make full use of radioactive-beam capabilities, the inverse-kinematics surrogate method needs to be developed further. This presentation summarizes recent applications of the surrogate approach to  $(n,\gamma)$  reactions. The limitations of frequently-employed approximation schemes will be discussed, as well as progress made in moving beyond these limitations. Results will be shown for the gadolinium region.

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