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**Determining Cross Sections for Low-Energy Neutron Capture Reactions via the Surrogate method - Recent Progress**<sup>1</sup> JUTTA E. ESCHER, FRANK S. DIETRICH, NICHOLAS D. SCIELZO, Lawrence Livermore National Laboratory — Many reactions of interest to nuclear energy and astrophysical applications cannot be measured directly since they involve short-lived or highly radioactive target nuclei. The Surrogate reaction method is an indirect approach for determining compound-nuclear reaction cross sections via a combination of theory and a transfer-reaction or inelastic-scattering experiment. Past applications of the method have demonstrated that it can provide useful cross section estimates for neutron-induced fission of actinides. Most analyses of fission data carried out so far have made approximations that are expected to break down for situations relevant to extracting  $(n,\gamma)$  cross sections from Surrogate measurements. This presentation focuses on the prospects for employing the Surrogate method to obtain cross sections for neutron capture on unstable nuclei. A brief outline of the approach will be given and recent progress made in moving beyond currently-employed approximations, such as the Weisskopf-Ewing and Ratio approximations, will be discussed. An application of the newly-developed tools to data taken recently by STARS/LiBerACE collaboration for the gadolinium region will be presented.

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