Recent results on actinide cross sections deduced using the surrogate ratio method.

C.W. Beausang,
Physics Department
University of Richmond

A University of Richmond, Lawrence Livermore National Laboratory and Lawrence Berkeley National Laboratory Collaboration.

It is often difficult, or impossible, to directly measure neutron induced cross sections on short lived unstable nuclei. An alternative to direct measurements, the surrogate method, was pioneered in the 70's by Britt and Wilhelmy et al. and has recently been revived. Using the surrogate method the desired neutron induced reaction, A(n, x) (where x can represent a variety of exit channels and A is an unstable target), is mimicked by a surrogate reaction involving a stable beam on a stable target, B(c,x). The surrogate reaction is chosen to produce the same composite system at similar excitation energies and angular momentum distribution as the direct reaction. An extension of the surrogate method, the surrogate ratio method (SRM) has recently been developed and is proving to be quite successful and robust for extracting cross sections for fission yields and (n,g) cross sections on unstable nuclei. In the *external* SRM the ratio of yields in the same exit channel, but from two different (but similar) compound nuclei is measured. For the *internal* SRM the ratio of yields from two different exit channels (e.g. fission or (n,g)) from the same compound nucleus is measured. Benchmarking experiments, using the STARS / Liberace array have shown the SRM to be quite robust for extracting cross sections in actinide nuclei. Recent results from benchmarking and other experiments using the STARS / Liberace array will be presented.