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## Surrogate Nuclear Reaction Methods

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Cross sections for compound-nuclear (CN) reactions are important for nuclear astrophysics and other applications. Direct measurements are not always possible for the reactions of interest and calculations without experimental constraints can be quite uncertain. Thus indirect approaches, such as the surrogate reaction method (SRM), are being developed to fill the gaps. The SRM, which uses a (direct) inelastic scattering or transfer reaction to obtain information on the decay of a specific compound nucleus, has a long history of providing probabilities for fission, gamma and particle emission. While earlier implementations of the method used minimal theory to provide approximate cross sections for (n,f) reactions, better theoretical descriptions of the underlying reaction mechanisms have made it possible to also obtain (n, $\gamma$ ), (n,n'), and (n,2n) cross sections that agree well with benchmarks. I will discuss multiple applications of the modern implementation of the SRM, highlight theory advances that enable them, and comment on opportunities offered at new experimental facilities.

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