

Cross section evaluations for scattering involving particle-unstable resonances

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How does the scattering cross section change when the colliding bound-state fragments are allowed particle-emitting resonances? This question is explored in the framework of a multi-channel algebraic scattering method of determining nucleon-nucleus cross sections at low energies. Two cases are examined, the first being a gedanken investigation in which $n + \text{carbon-12}$ scattering is studied with the target states assigned artificial widths. The second is a study of neutron scattering from beryllium-8; a nucleus that is particle unstable. Resonance character of the target states markedly varies evaluated cross sections from those obtained assuming stability in the target spectrum.