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Width Fluctuation Correction Factor for Beta-delayed Neutron Emission

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Porter-Thomas fluctuations of neutron widths are known to skew compound nuclear decay probabilities away from their statistical, Hauser-Feshbach values. For Hauser-Feshbach codes, the common remedy is to apply the width-fluctuation correction factor of Moldauer, or similar, which accounts for correlations between the entrance and exit channels. For more exotic reactions like beta-delayed neutron emission, the effect is subtler, arising due to statistical fluctuations of the total neutron widths rather than correlations between channels. Some authors have tackled the problem by Monte Carlo simulations, where individual levels and partial widths are simulated from the appropriate random distributions, with statistics chosen to reproduce the usual level density, photon strength function, and neutron transmission coefficients. The disadvantage of this is increased compute time. I demonstrate a simpler, alternative method for taking Porter-Thomas fluctuations into account for one-neutron decay near threshold using a method analogous to the width fluctuation correction factor of Moldauer.

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