**Investigating Methods for Fitting the Neutron Missing Mass Spectra from the CLAS12 Detector**[1] J.Buckley, University of Surrey, G.Gilfoyle, University of Richmond, L. Baashen, Florida International University - Neutron detection in the CLAS12 detector at Jefferson Laboratory requires a precise measurement of the Neutron Detection Efficiency (NDE). We determine the NDE from existing data by tagging neutrons created in the $ep \to e'\pi^+ n$ reaction. We select $e'\pi^+$ events with no other charged particles and assume a neutron in the final state. The expected neutron position on the face of the calorimeter is calculated from four-momentum conservation and we search for a detected neutron near the expected position. These neutrons occupy thirty-six momentum bins in the range $p_m = 0.41-6.75$ GeV/c. The NDE is the ratio of detected to expected neutrons. There is background at high Missing Mass (MM) under the neutron peak so we fit the neutron MM Spectra to extract the neutron yield using a Crystal Ball Function for the neutron peak and a polynomial background. The Crystal Ball function is a Gaussian distribution with a low missing mass power-law tail. We expect the fit parameters to vary smoothly from one momentum bin to the next so each fit is started from the fit parameters of the adjacent momentum bin. We also investigate a Double Crystal Ball function, supporting an additional power-law tail at high missing mass. We compare the results of both functions.
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