

Simulation of the CLAS12 Neutron Detection Efficiency¹ Y.Hu, M.Xie, G.P.G Gilfoyle, University of Richmond, L. Baashen, King Saud University, CLAS Collaboration - The CLAS12 detector at Jefferson Lab (JLab) includes calorimeters for neutron detection. A critical property is their neutron detection efficiency. We use simulations of electron scattering on protons to study neutron production and background from other reactions. An event generator produces initial 4-vectors and the passage of particles through CLAS12 is simulated with the geant-based program *gemc*. These pseudo-data are reconstructed with the same tools used for production data. We focused on the $ep \rightarrow e'\pi^+n$ reaction as a source of tagged neutrons. The events were generated and processed on the JLab high-performance computing facility. We select events with $e'\pi^+$ in the final state, no additional charged particles, and assume the remaining particle is a neutron. We matched reconstructed particles with the generated data to verify the detected particle identities. We use four-momentum conservation to extract the missing mass (MM) of the neutron in eight momentum bins and fit the MM distribution with a Crystal Ball function and a polynomial background. Values of the reduced chi-square lie in the range 0.5-2. A Gaussian function gives similar values. We will present results comparing these and additional functions for the neutron peak and the background.

¹ Supported by the US Department of Energy.