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Physics Opportunities with the Neutral Particle Spectrometer in Hall C[1] TANJA HORN, Catholic Univ of America, NPS COLLABORATION — The two-arm combination of neutral-particle detection and a high-resolution magnetic spectrometer offers unique scientific capabilities to push the energy scale for studies of the transverse spatial and momentum structure of the nucleon through reactions with neutral particles requiring precision and high luminosity. It enables precision measurements of the deeply-virtual Compton scattering cross section at different beam energies to extract the real part of the Compton form factor without any assumptions. It allows measurements to push the energy scale of real Compton scattering, the process of choice to explore factorization in a whole class of wide-angle processes, and its extension to neutral pion photo-production. It further makes possible measurements of the basic semi-inclusive neutral-pion cross section in a kinematic region where the QCD factorization scheme is expected to hold, which is crucial to validate the foundation of this cornerstone of 3D transverse momentum imaging. Adding the option of polarized targets to such a setup, allows for exploration of further scientific directions, e.g., timelike Compton scattering. We describe the unique science program as enabled by the Neutral-Particle Spectrometer and the magnetic spectrometer pair in Hall C at JLab.

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