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Searching for Color Transparency effects at 22 GeV

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Searching for the onset of Color Transparency (CT) is a vibrant experimental effort to observe hadrons in a small color-neutral transverse size configuration in the nucleus. The observation of the onset of CT lies at the intersections between the quark-gluon degrees of freedom and the nucleonic descriptions of nuclei. CT is fundamentally predicted by perturbative quantum chromodynamics and is expected to be observable in exclusive scattering as a reduction of final state interactions (FSI) of the point-like hadron with the nuclear medium. Experimentally, this would yield a rise in the measured transparency of the point-like hadron with increasing four-momentum transferred.

Recent experiments in the Jefferson Lab 12 GeV program have explored the onset of CT for protons in Hall C with a null observation, and the analysis of CT effects in rho-mesons in the Hall B CLAS12 detector is currently underway. Near-term future experiments in the 12 GeV program will extend the Q2 range of the transparency measurements of pion electroproduction in Hall C, and another experiment will seek to enhance the signal for observing CT for protons in Hall C by measuring protons from rescattering in deuterium.

A 22 GeV upgrade at Jefferson Lab would enable improved precision and higher accessible Q2 for extending the above-mentioned experiments in Halls B and C examining the CT in rho-mesons, pions, and protons with the current experimental equipment. This talk will discuss these measurements and will explore other experimental prospects to search for the CT effects at 22 GeV.

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