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Scale-Dependent View of d(e,e'p) Measurements[1]

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Isolating nuclear structure properties from knock-out reactions in a process-independent manner requires a controlled factorization, which is always to some degree scale and scheme dependent. Understanding this dependence is important for robust extractions from experimental measurements, to correctly use the structure information in other processes, and to understand the impact of approximations for both. We discuss scale dependence using deuteron electrodisintegration as perhaps the simplest example. Our principal tool is the similarity renormalization group, which we use to evolve the components of a theoretical calculationthe initial deuteron wave function, the current operator, and the final-state interactions (FSIs)to different resolution scales. Visualizations show that the physical picture of deuteron electrodisintegration is scale dependent and not just kinematics dependent. As a result, intuition about physics such as the role of short-range correlations in particular kinematic regimes can be strongly scale dependent.

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