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Highlights of the CEBAF 6 GeV Physics Program

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Since 1995, the Continuous Electron Beam Accelerator Facility (CEBAF) at Jefferson Laboratory has produced a high-current, nearly cw electron beam in the multi GeV range, bringing with it a new era for electron scattering in nuclear physics. Originally planned to be 4 GeV, advances in superconducting radiofrequency (SRF) accelerator technology allowed beam energies up to 6 GeV prior to the recently completed 12 GeV upgrade. The 6 GeV physics program included many highlights that have transformed our understanding of nuclear and nucleon structure. For example, the discovery of unanticipated behavior of the nucleon form factors has altered the prevailing picture of nucleon structure. The measurement of tiny parity-violating asymmetries has both constrained the strangeness content of the nucleon, and provided new insight into the properties of neutron-rich matter. Parity violation has also been used to provide new constraints on the Standard Model. Pioneering measurements of Generalized Parton Distributions (GPDs) and Transverse Momentum Dependent (TMD) distributions have set the stage for multi- dimensional imaging of the nucleon. Measurements of the short-distance-scale interactions between nucleons have shed light on both nuclear structure as well as the behavior of nucleon structure functions when those nucleons are embedded in nuclei. Indeed, the JLab 6 GeV program has deepened our understanding of QCD, and provided motivation for both the 12 GeV upgrade as well as the future Electron Ion Collider.