Parton structure of the proton

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Abstract

It has been nearly 50 years since the discovery of the proton’s constituents, the quarks and gluons. Since then, much experimental and theoretical advancement has been made in probing and describing their properties. A plethora of data from multiple deep inelastic (DIS) and hadron-proton scattering experiments is now used to extract the proton’s parton distribution functions (PDFs), which describe the momentum distributions of quarks and gluons in the proton. Although current theoretical tools are unable to predict PDFs, modifications to PDFs from perturbative effects can be predicted by QCD. In addition, polarized scattering experiments yield analogous spin-dependent PDFs that can be used to quantify parton contributions to the total spin of the proton. This talk will give a brief introduction to the theoretical framework and experiments that are used to investigate the parton structure of the proton.