

Spin Structure of the Proton: Looking Back and Looking Forward

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The spin structure of the proton has been one of the most important quests driving high-energy spin physics in recent years. In this talk, I review the status of theoretical studies in this area. In particular, I will discuss present understandings of the quark sea polarization, gluon polarization, and quark orbital angular momentum. Theoretical expectations about the gluon polarization, its magnitude and x -dependence, are elaborated upon. Global fits of polarized parton distributions are commented. Generalized parton distributions and their role in understanding the quark and gluon orbital angular momenta are examined. Relevant lattice QCD results will be briefly reviewed. Single spin asymmetries and their roles in the spin structure are discussed. I will also point out the future opportunities for significant breakthroughs in understanding the proton spin.