# PREFACE

The Spin Structure of the Proton is one of the most challenging open puzzles in Quantum Chromodynamics. Key particle physics experiments in deep inelastic scattering suggest that just $\sim 30\%$ of the spin of the proton is carried by the intrinsic spin of its quark constituents – considerably less than the prediction of relativistic constituent quark models ($\sim 60\%$). This discovery has challenged our understanding about the internal structure of the proton and inspired vast experimental and theoretical activity to understand the role of spin in the proton's internal structure: about 1000 theoretical papers and a new programme of dedicated experiments at CERN and DESY in Europe, and BNL, JLab and SLAC in the United States.

Until recently, the main experimental activity has focussed on fully inclusive measurements of the proton's $g_1$ spin structure function with longitudinally polarized targets. New experiments are underway to measure the separate flavour- and spin-dependent parton distributions for the proton's valence quark, sea quark and gluonic constituents, and to investigate the spin structure of transversely polarized protons. The important questions are: How is the spin of the proton built up out from the intrinsic spin and orbital angular momentum of its quark and gluonic constituents? What happens to spin and orbital angular momentum in the transition from current quarks to constituent quarks in low-energy QCD? Does the proton spin puzzle involve the suppression of the valence quark spin contribution or do the sea quarks and gluons conspire to reduce the total quark spin content in the proton? Here we give an overview of the present status of our understanding: *How does the proton spin?*

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