

Topological screening and sphaleron transitions in polarized deeply inelastic scattering at the Electron-Ion Collider

We employ a powerful worldline formalism to uncover the role of the chiral anomaly in polarized deeply inelastic scattering in QCD at high energies and demonstrate simply that the anomaly dominates the proton's helicity in both Bjorken and Regge asymptotics. We independently confirm Veneziano's argument that the physics underlying topological mass generation in QCD (the UA(1) problem) is also the physics that explains the "spin crisis" demonstrating the failure of the relativistic quark model. We go further and suggest that measurements of polarized structure functions at an Electron-Ion Collider can uncover first evidence for topological "Sphaleron-like" transitions in nature.

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