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Probing the Gluon Helicity Distribution at SPD

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Since the results the from European Muon Collaboration (EMC) indicated that the combined quarks and anti-quarks account for only about one-quarter of the proton spin, theories and experiments have been trying to understand and measure the contributions from other sources. Gluons have been of particular interest in the last couple of decades. Spin asymmetry measurements from proton-proton collisions sensitive to gluons are the prime channels to access this information. After years of suggested models predicting a variety of gluon spin contributions, RHIC results helped constrain the gluon helicity PDF in the last decade. The proposed Spin Physics Detector (SPD) at the NICA facility in JINR, Dubna will be an excellent laboratory to probe various gluon spin distributions inside protons and deuterons. In particular, double helicity asymmetry measurements at SPD will be sensitive to the gluon helicity distributions and will make signicant contributions to constrain the uncertainties in the large momentum fraction (Bjorken x) region ($0.3 \leq x \leq 0.5$).

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