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Total Gluon Helicity from Lattice without Effective Theory Matching

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We propose two approaches for extracting the total gluon helicity contribution to proton spin from lattice QCD, one from local operator matrix elements in a fixed gauge accessible on lattice with feasible renormalization, and the other from gauge-invariant nonlocal gluon correlators. Neither of these approaches requires a matching procedure when converted to the MS scheme. Our proposal resolves a long-standing inconsistency in the literature regarding lattice calculations of the total gluon helicity, and has the potential to greatly facilitate these calculations.

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