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Towards determining gluon helicity distribution in the nucleon from lattice QCD

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We present a lattice QCD calculation towards determining gluon helicity distribution and how much of the proton's spin budget is contributed by gluons. We consider matrix elements of bilocal operators composed of two gluon fields that can be used to determine the polarized gluon Ioffe-time distribution and the corresponding parton distribution function. We employ a high-statistics computation using a $32^3 \times 64$ lattice ensemble with 358 MeV pion mass and 0.094 fm lattice spacing using a combination of numerical techniques previously proven successful for the case of unpolarized gluon distribution. An important outcome of this work is that we find a hint for a nonzero gluon spin contribution to the proton spin from the model-independent extraction of gluon helicity Ioffe-time distribution over a range of Ioffe-time, $\nu \leq 9$.

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