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A glimpse of the proton spin through lattice

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Deep-inelastic scattering experiments reveal that contrary to the naive quark model, the quark spin contribution to the proton spin is quite small, about 30%. In an effort to search for the missing proton spin, recent analyses of the high-statistics 2009 STAR experiments at RHIC showed evidence of non-zero glue helicity in the proton. However, the results are limited by very large uncertainty in the x<0.05 region.

To address this issue from the theoretical side, we made the first lattice QCD calculation of the glue spin in the proton based on the LaMET framework, and the results suggested that a large part of the missing component of the proton spin comes from the gluon spin. The results on the other parts of the proton spin will be also presented.