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The gluon distribution functions and angular momentum in the proton

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We study the leading twist gluon generalized parton distributions (GPDs) and the Wigner distributions of the gluons in the proton within a light-cone spectator model. The model provides an approach to generate the gluon degree of freedom from the proton target, in which the proton is regarded as a two-particle composite system composed of an active gluon (g) and a spectator particle (uud). We present the numerical results of H^g, E^g, $\tilde{H}^g$, H_T^g and E_T^g as functions of x at different $\Delta_\perp$. The Wigner distributions W_{UU}, W_{LU}, W_{UL} and W_{LL} are also provided. Using the above results, we further investigate the total angular momentum, the orbit angular momentum and the spin-orbit correlations of gluons.

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