

# 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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