Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Transverse-spin gluon distribution function KAZUHIRO TANAKA, Juntendo University — We define the novel polarized parton distribution function, the transverse-spin gluon distribution function $G_T(x)$, as the nucleon matrix element of the gauge-invariant bilocal light-cone operator in QCD, and discuss their properties. $G_T(x)$ is the gluonic analogue of the transverse-spin quark distribution function $g_T(x)$ that contributes to the transverse-spin structure function $g_2(x, Q^2)$ in the deep inelastic scattering of a longitudinally-polarized lepton off a transversely-polarized nucleon target. $g_T(x)$ and $G_T(x)$ are relevant to the "angular momentum sum rule" for the transversely-polarized nucleon, because their integral over x gives, respectively, the quark and gluon spin contributions arising in the partonic decomposition of the transverse nucleon spin. We show that $G_T(x)$ can be expressed as the sum of the chromoelectric and chromomagnetic light-cone correlators; both of these are of twist-three and correspond to the helicity flip by one unit, similarly as the helicity-flip nature of $g_T(x)$. The relevance of the chromomagnetic correlator has not been noticed so far. We derive the moment sum rules for $G_T(x)$ and the corresponding operator product expansion, and demonstrate that $G_T(x)$ receives the three-gluon correlation effects.

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Date submitted: 01 Jul 2014 Electronic form version 1.4