Twist-3 Mechanism for Single Spin Asymmetry Reexamined

YUJI KOIKE, Niigata University, KAZUHIRO TANAKA, Juntendo University — In the framework of the collinear factorization, single transverse spin asymmetry (SSA) is a twist-3 observable which represents quark-gluon correlations in a hadron. In this talk, we present a lightcone-gauge calculation of SSA for the direct-photon production in the pp collision which is relevant for the RHIC-SPIN program. Some time ago, Qiu and Sterman presented a Feynman-gauge calculation for the quantity. The derivation of the cross section for SSA involves identification of the pole contribution in the Feynmann diagram, and expressing SSA in terms of gauge invariant correlation functions is quite involved. So it is interesting to reexamine the result in a different gauge. After identifying the relation between different representations of the twist-3 distribution functions for the transversely polarized nucleon, we show how each pole contribution can be identified and expressed in terms of the gauge invariant functions in the lightcone gauge.