



Contribution ID: 3

Type: Parallel Session Talk

On the $\sin \phi_R$ azimuthal asymmetry single longitudinal-spin asymmetry in dihadron production in SIDIS

Wednesday 10 April 2019 16:49 (17 minutes)

We study the single longitudinal-spin asymmetry of dihadron production in semi-inclusive deep inelastic scattering process in which the transverse momentum of the final-state hadron pairs is integrated out. In Particular, we investigate origins of the $\sin \phi_R$ azimuthal asymmetry for which we take into account the coupling of the twist-3 distributions h_L and the dihadron fragmentation function (DiFF) $H_{1,ot}^{sphericalangle}$ as well as the coupling of the helicity distribution g_1 and the twist-3 DiFF $\tilde{G}^{sphericalangle}$. To this end The unknown twist-3 dihadron fragmentation function $\tilde{G}^{sphericalangle}$ is calculated in a spectator model which is successful in describing the dihadron production in unpolarized process. We estimate the $\sin \phi_R$ asymmetry of dihadron production in SIDIS at the kinematics of COMPASS and compare it with the preliminary COMPASS data. In addition, we make a prediction on the $\sin \phi_R$ asymmetry at the typical kinematics of future EIC. Although the asymmetry is dominated by the $h_L H_1^{sphericalangle}$ term, we find that the contribution from the $g_1 \tilde{G}^{sphericalangle}$ term should also be taken into account in certain kinematical region.

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Session Classification: WG6: Spin and 3D structure

Track Classification: WG6: Spin and 3D structure