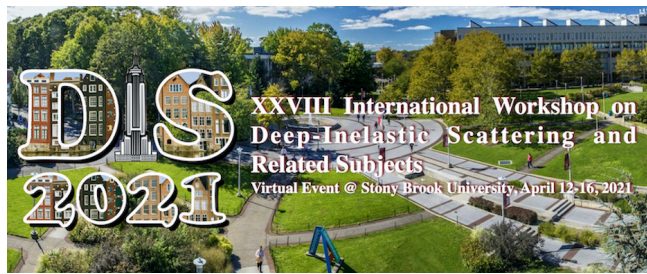


XXVIII International Workshop on Deep-Inelastic Scattering and Related Subjects



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Non-zero transverse single spin asymmetry of very forward π^0 in polarized $p + p$ collisions at $\sqrt{s} = 510$ GeV

Wednesday, 14 April 2021 10:00 (18 minutes)

Through the 21st and 22nd International Workshop on Deep Inelastic Scattering, a possibility of the non-perturbative contribution for the non-zero transverse single spin asymmetry of π^0 ($2 < \eta < 4$) was brought up. Bigger asymmetry was observed in more isolated final state which was connected with the non-perturbative event topology. Since the non-perturbative contribution has been studied by only the forward π^0 production where the perturbative process was expected to be the major interaction rather than non-perturbative one, the RHICf experiment measured the very forward ($\eta > 6$) π^0 to study the role of the non-perturbative interaction in more detail. We installed a new electromagnetic calorimeter at the zero-degree area of the STAR experiment at the Relativistic Heavy Ion Collider and measured the π^0 over the kinematic range of $x_F > 0.25$ and $0 < p_T < 1$ GeV/c in June, 2017. A clear non-zero asymmetry was observed even in low $p_T < 1$ showing a similar x_F dependence with the forward π^0 one as the p_T approached to 1 GeV/c. The non-perturbative interaction may induce its own non-zero asymmetry and there may be also a non-negligible contribution from it in the forward π^0 asymmetry. We present the first measurement of the very forward π^0 asymmetry and its result. A future aspect to more precisely study both of the perturbative and non-perturbative contribution will be also discussed.

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