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Transverse single spin asymmetry for very forward neutron production in polarized $p+p$ collisions at $\sqrt{s} = 510$ GeV

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In the high-energy $p+p$ collisions, the transverse single spin asymmetry for very forward neutron production has been interpreted by an interference between π (spin flip) and a_1 (spin non-flip) exchange with a non-zero phase shift. The π and a_1 exchange model predicted the neutron asymmetry would increase in magnitude with transverse momentum (p_{T}) in $p_{\mathrm{T}} < 0.4$ GeV/c. In June 2017, the RHICf experiment installed an electromagnetic calorimeter at the zero-degree area of the STAR experiment at the Relativistic Heavy Ion Collider and measured the neutron asymmetry in a wide p_{T} range of $0 < p_{\mathrm{T}} < 1$ GeV/c from polarized $p+p$ collisions at $\sqrt{s} = 510$ GeV. The RHICf data allows us to study the kinematic dependence of the neutron asymmetry in detail, which not only can test the π and a_1 exchange model in the wider p_{T} range but also can enrich our understanding for the spin-involved diffractive particle production mechanism. We present the final result of the neutron asymmetry measured by the RHICf experiment. A new theoretical trial to understand the RHICf result based on the Reggeon exchange will also be discussed.

Submitted on behalf of a Collaboration?

Yes

Participate in poster competition?

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