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Gluon polarization measurements from longitudinally polarized proton-proton collisions at STAR

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Jets produced in the pseudo-rapidity range, $-1.0 < \eta < 1.0$, from pp collisions at RHIC kinematics are dominated by quark-gluon and gluon-gluon scattering processes. Therefore the longitudinal double-spin asymmetry A_{LL} for jets is an effective channel to explore the longitudinal gluon polarization in the proton. At STAR, jets are reconstructed in full azimuth, from the charged-particle tracks seen by the Time Projection Chamber and electro-magnetic energy deposited in the Barrel and Endcap electro-magnetic calorimeters at both $\sqrt{s} = 200$ and 510 GeV. Early STAR inclusive jet A_{LL} results at $\sqrt{s} = 200$ GeV provided the first evidence of the non-zero gluon polarization at $x > 0.05$. At $\sqrt{s} = 510$ GeV, the inclusive jet A_{LL} is sensitive to the gluon polarization as low as $x \sim 0.015$. In this talk, we will discuss recent STAR inclusive jet and di-jet A_{LL} results at $\sqrt{s} = 510$ GeV and highlight the new techniques designed for this analysis, for example the underlying event correction to the jet transverse energy and its effect on the jet A_{LL} . Di-jet A_{LL} results are shown for four topologies in regions of pseudo-rapidity, effectively scanning the x -dependence of the gluon polarization.

Additional comments

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