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Inclusive Jet Measurements in Longitudinally Polarized Proton-Proton Collisions at STAR

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Jet production in high energy proton-proton (pp) collisions is dominated by hard QCD scatterings such as gluon-gluon (gg) and quark-gluon (qg) scatterings, and therefore an effective tool to probe the internal distribution of gluons in the proton. The STAR Collaboration at Relativistic Heavy Ion Collider (RHIC) is using longitudinally polarized pp collisions at center of mass energies, $\sqrt{s} = 200$ and 510 GeV, to study the production cross-section and double helicity spin asymmetry, A_{LL} , of inclusive jet and di-jet productions. The inclusive jet and di-jet cross-section measurements by STAR at $\sqrt{s} = 200$ GeV showed the jet cross-section is consistent with next-to-leading-order perturbative QCD calculations after underlying event and hadronic corrections. The STAR 2009 inclusive jet A_{LL} measurement in mid-pseudo-rapidity range, $|\eta| < 1.0$, at $\sqrt{s} = 200$ GeV showed the first experimental evidence of a non-zero gluon polarization for Bjorken- x , $x > 0.05$. The inclusive jet A_{LL} measurements at $\sqrt{s} = 510$ GeV allow to explore the gluon polarization at smaller $x \sim 0.02$. In this talk, the inclusive jet A_{LL} and cross-section measurements at $\sqrt{s} = 510$ GeV, the techniques used in the jet analysis including consideration of underlying event effects, and future perspectives related to jet measurements at STAR will be presented.

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