

Recent results from the STAR cold QCD program

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1 The Relativistic Heavy Ion Collider (RHIC) is the world's only
2 polarized proton collider, capable of reaching center of mass energies up to
3 510 GeV. The STAR experiment has been carrying out a cold QCD
4 program, to gain deeper insight into the spin structure and dynamics of the
5 proton. The collection of longitudinally polarized data concluded in 2015.
6 One of the goals of this data is to study the gluon helicity distribution
7 function ($\Delta g(x)$), by measuring the longitudinal double-spin asymmetry
8 (A_{LL}) of jets. Measurements were taken at $\sqrt{s} = 200$ GeV and 510 GeV with
9 different topological configurations in pseudorapidity (η), to maximize the
10 kinematic coverage in momentum fraction (x) down to ~ 0.01 and to better
11 constrain the shape of $\Delta g(x)$. On the other side, the transversely polarized
12 proton collisions at RHIC enable the studies of the transverse spin structure,
13 such as the transversity and Sivers distributions, as well as polarized
14 fragmentation functions. These studies can be used to test universality, and
15 given STAR's wide kinematic range, also aid in constraining transverse
16 momentum dependent evolution effects. In this talk, we present the recent
17 STAR measurements for longitudinal and transverse polarization, besides
18 selected unpolarized results. STAR is currently installing a suite of new sub-
19 detectors in the forward region ($2.5 < \eta < 4$). How those upgrades will
20 supplement previous STAR measurements will also be briefly discussed.