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Single hadron double longitudinal spin asymmetries at $p_T 1$ GeV/c measured at COMPASS

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In order to understand why quarks only share about a third of the nucleon spin, quite a few recent experiments have focussed on the measurement of the gluon polarization in the nucleon. To access the gluon polarization, reactions where the Photon Gluon Fusion sensibly contributes are necessary. A way to enhance the PGF contribution in lepton-nucleon or nucleon-nucleon scattering is to study production of hadrons at high transverse momentum where p_T is the hard scale.

RHIC has recently measured such double spin asymmetries $A_{LL}(p_T)$ for pion production at high center of mass energies, and inclusion of its data to global fits based on NLO collinear pQCD calculations gives some constraints on the gluon polarization in the range $0.05 x_G 0.2$ [ref 1]. The validity of the calculations of partonic cross sections at NLO has recently been extended to COMPASS at lower center of mass energies by adding leading-log gluon resummation in the unpolarized case [ref. 2], and they reproduce now within scale uncertainty the cross section for single hadron production as a function of p_T measured recently at COMPASS [ref. 3]. Once extended to the polarized case, $A_{LL}(p_T)$ measurements at COMPASS can also be used to constrain the gluon polarization without uncertainties about validity of the NLO pQCD framework at COMPASS energies.

We will present preliminary COMPASS results on double longitudinal spin asymmetries $A_{LL}(p_T)$ for single hadron production measured on the deuteron and the proton at $Q^2 1$ GeV^2, $p_T 1$ GeV/c and center of mass energy $\sqrt{s} = 18$ GeV. All COMPASS data taken from 2002 to 2011 by scattering 160 GeV polarized muons on longitudinally polarized $^6 LiD$ and NH_3 targets have been used, and the number of hadrons collected with $p_T 1$ GeV/c for this analysis amounts to about 10 millions. The obtained asymmetries will be compared to theoretical predictions of [ref. 4], with possibly inclusion of LL gluon resummation for the polarized case if available in time.

[1] E.C. Aschenauer et al., arXiv:1304.0079 [nucl-ex]

[2] D.P. Anderle, F. Ringer and W. Vogelsang, Phys. Rev. D87 (2013) 034014

[3] C. Adolph et al. (COMPASS collaboration), Phys. Rev. D88 (2013) 091101

[4] B. Jager, M. Stratmann and W. Vogelsang, Eur. Phys. J C44 (2005) 533

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