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Recent COMPASS results on the measurement of spin-dependent azimuthal asymmetries in SIDIS and Drell-Yan}

COMPASS is a high energy physics experiment at CERN (SPS, M2 beamline). One of the main objectives of the experiment is the study of the transverse spin structure of the nucleon through measurement of target spin (in)dependent azimuthal asymmetries in semi-Inclusive Deep Inelastic Scattering and Drell-Yan processes with transversely polarized targets. Within the QCD improved parton model approach, these physics observables are interpreted in terms of convolutions of quark Transverse Momentum Dependent (TMD) Parton Distribution Functions (PDFs) of the nucleon and TMD Fragmentation Functions (in SIDIS), or of the beam hadron TMD PDFs (in Drell-Yan). In general the nucleon TMD PDFs are supposed to be process-independent, with the exception of time-reversal odd Sivers and Boer-Mulders TMD PDFs which are expected to have opposite sign when measured in SIDIS and in Drell-Yan. The latter conjecture is based on gauge invariance of QCD and is considered to be a fundamental test of TMD factorization framework.

Between 2002 and 2010 COMPASS performed a series of SIDIS measurements, using a longitudinally polarized muon beam scattering off transversely polarized ^{6}LiD or NH_3 targets. In 2015 the experiment collected first ever single-polarized DY data, using a 190 GeV/c π^- beam impinging on a transversely polarized NH_3 target. Thus, COMPASS became the only facility exploring the transverse spin structure of the nucleon via two alternative mechanisms. The measurements were done at a similar kinematic range using mostly the same experimental setup and polarized target configurations. This opens the unique opportunity to study the universality of the TMD PDFs and to test the predicted sign-change of Sivers and Boer-Mulders TMD PDFs.

In this talk, recent Drell-Yan and relevant SIDIS results obtained by COMPASS experiment will be presented. The role and importance of the results for the general understanding of the transverse-spin structure of the nucleon will be underlined.

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