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Angular dependence and target-spin dependent asymmetries in pion-induced collisions at the COMPASS experiment

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The COMPASS experiment, located in the North Area of CERN, has the study of nucleon structure as one of its main physics goals. In 2015 and 2018, COMPASS collected Drell-Yan and J/ψ production data from the collisions of a 190 GeV negative pion beam on a transversely polarized ammonia target, and on a tungsten target. The study of the angular dependence of the dimuons produced provides valuable information on the transverse momentum dependent parton distribution functions (TMD PDFs) of both the nucleon and the pion. The measurement of target-spin dependent azimuthal asymmetries is of particular interest, as it can be used to test the predicted sign change of the Sivers TMD PDF when measured in the Drell-Yan process, as compared to the one measured in semi-inclusive deep inelastic scattering. The COMPASS experiment has the advantage of measuring both processes in very similar phase space. On the other hand, the transverse spin asymmetries measured in J/psi production may give access to the gluon Sivers TMD PDF, while improving our understanding of the charmonium production mechanisms. The most recent COMPASS results on dimuon angular dependences and target transverse spin dependent asymmetries will be presented.

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