

Title: Study of azimuthal asymmetries in COMPASS Drell-Yan data

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Abstract: Drell-Yan (DY) process, i.e. a lepton pair production in hadron-hadron interaction, is one of the unique tools to study structure of hadrons. In this thesis we present its theoretical background and its link to description of the nucleon spin structure. The corresponding formalism of the Parton Distribution Functions (PDF) and the Transverse Momentum Dependent Parton Distribution Functions (TMD PDF) is explained in some detail. The fundamental theoretical prediction of a sign change of the  $T$ -odd TMDs in the DY and Semi-inclusive DIS (SIDIS) is described. In the following a concise description of the COMPASS apparatus is given with the emphasis on the setup modification needed and implemented for the Drell-Yan measurement performed in 2014 and 2015 with  $190 \text{ GeV}/c^2$  beam of negative pions and the proton target (polarised in 2015). In the final chapter we present our independent analysis of the DY data taken in 2015. Three azimuthal asymmetries giving access to the different TMD PDF were extracted using the dimuon events from a mass region of  $4.3$  to  $8.5 \text{ GeV}/c^2$ . Our results are in agreement with the official results recently submitted for publication, and give a significant hint toward the sign change.