

Title: Studies of Drell-Yan process with polarized target at COMPASS

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Abstract: The presented thesis intends to give an introduction into the studies of the spin structure of a nucleon. The knowledge about the structure of nucleon has grown in the last few decades; however, its spin structure is still a mystery. One of the concepts that might help solving this spin puzzle is the polarized Drell-Yan process. This process can give us the access to the spin-dependent structure functions of a nucleon via measuring spin asymmetries. In the following text, an outline of the theoretical background of the semi-inclusive Deep Inelastic Scattering and the Drell-Yan is given. The Parton Distribution Functions (PDFs) and the transverse-momentum-dependent PDFs (TMDs) are discussed. And the way of accessing the TMDs via polarized Drell-Yan process is briefly described. This is the goal of the Drell-Yan program at COMPASS experiment, using the transversely polarized target and pion beam in 2014-15. The description of experimental apparatus is given and the system of collecting and processing data is outlined. The data-taking conditions of the 2009 DY beam test and the 2014 DY data-taking are presented. From the data of these runs, we performed the analysis of the dimuon pair production and the kinematic distributions. The comparison of the results from the particular run and with the official results is given. The expectations of the 2015 DY run are also discussed.

Keywords: Drell-Yan process, low-temperature polarized target, spin structure of nucleon, PDFs, TMDs