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DVCS, TMDs and Spin Physics at COMPASS

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Recent results on the nucleon spin structure from COMPASS
COMPASS is a multi-purpose fixed target experiment at the CERN Super Proton Synchrotron, dedicated to the study of the spin and the structure of the nucleon. From 2002 to 2011, high statistics data for polarized inclusive and semi-inclusive deep inelastic scattering were collected using 160 GeV/c polarized muons on polarized deuteron and proton targets. The data are used to derive the gluon contribution to the nucleon spin, and to determine the up, down and strange quark and anti-quark polarized distributions. They also constrain the g1 longitudinal spin structure function, and thus the Björken sum rule, with greater accuracy. The implications of these results to our present understanding of the nucleon spin puzzle will be discussed. The COMPASS plans for the future will be presented.

Prospects for a DVCS measurement at COMPASS
The high energy polarised muon beam available at CERN with the option of using positive or negative muons with opposite polarisation gives COMPASS an excellent possibility to study generalised parton distributions via deeply virtual Compton scattering.
In a first step we propose to use an unpolarised proton target to study the slope of the momentum transfer distribution as a function of xbj. Furthermore, the beam charge and spin difference will be measured over a wide kinematical range to determine the Compton form factor related fo the GPD H. As a second step we consider to use a transversely polarised proton target to collect data to constrain the GPD E.
In preparation of the future measurements two DVCS test runs were performed in 2008 and 2009.

Measurements of TMDs at COMPASS
COMPASS is a fixed target experiment at CERN SPS, dedicated to the study of the nucleon spin structure with muon probe and on a variety of issues in the hadron spectroscopy sector. The transverse spin structure of the nucleon is investigated by measuring semi-inclusive deep inelastic scattering of a 160 GeV/c longitudinally polarized muon beam on transversely polarized targets.
A review of new and old COMPASS results on transverse spin effects will be given i.e. the measurement of the Collins and Sivers effects, the two hadron asymmetries and the lambda baryons polarisation, both on a deuteron and on a proton target. Transverse momentum effects, like the Cahn and the Boer-Mulders effects were measured on an un-polarized deuteron target, and will also be presented.
This year COMPASS is taking data on a transversely polarized proton target, to increase the precision of the measurements done in so far. But there are many other plans for the near future of COMPASS: successful test-beams were done to study the feasibility of both a polarized Drell-Yann measurement and a campaign dedicated to the study of the generalized parton distributions (GPD).

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