COMPASS plans to measure transversity

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The probability that a quark spin in a transversely polarised nucleon is oriented parallel or antiparallel to the nuclean spin can be accessed in semi-inclusive DIS off a transversely polarised target by analysing the polarisation of the struck quark e.g. via a measurment of the azimuthal asymmetry A_N for leading hadrons around the virtual photon direction. A_N is proportional to the wanted transversity distribution and the analyzing power of the polarised quark fragmentation.

A first result on azimuthal asymmetries was obtained by the SMC from a few weeks of data taking with transversely polarised proton and deuteron targets. SMC finds indications for positive asymmetries for positive hadrons from a proton target. The data seem to indicate that the yet unknown analysing power is sizeable.

The COMPASS collaboration plans to do a broad experimental programm in polarised deep inelastic muon scattering at the CERN muon beam using both longitudinally and transversely polarised targets. The experiment will use two 60 cm long oppositely polarised target cells in a solenoid with a large opening of ± 180 mrad and a two stage forward large acceptance spectrometer to measure and identity the scattered muons and produced hadrons. Due to the high luminosity of about 7 fb^{-1}/y significant statistics for a measurement of azimuthal asymmetries can be obtained within a few weeks of data taking.

Monte Carlo studies indicate that the dilution of the signal due to background and secondary interactions in the 60 cm long target cells is very small especially if a cut of about $z = E_h/\nu > 0.3$ is applied to the hadrons.

Currently the initial stage is being set up which is optimized for a measurement of the gluon polarisation $\Delta G/G$ via open charm production in photon gluon fusion with quasi real photons ($Q^2 \approx 0$). For this purpose the first spectrometer stage will be fully equipped while the second stage has no PID and large angle tracking, thus limiting the muon acceptance to small Q^2.

For the 2001 data run COMPASS will reuse the SMC polarized target (with a smaller solenoid opening) using ^{6}LiD as target material. The start of data taking for ΔG is forseen for september 2001.

In 2002 the new COMPASS polarised target should be available plus the complete initial stage to continue data taking for ΔG. In addition we will start to complete the tracking in the second stage. Also some hadron beam data taking is forseen. In the future we plan to use about 20% of the muon beam data taking for measurements with a transversely polarised target that could start in 2003.

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