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Measurement of the gluon polarization in the nucleon via spin asymmetries of charmed mesons

The main goal of the COMPASS spin physics program is the measurement of the helicity contribution of the gluon to the nucleon spin, $\Delta g/g$.

In deep inelastic scattering the gluon contributes to the cross section via the photon gluon fusion process, $\gamma^* + g \rightarrow q + \bar{q}$. The cleanest way to identify this process is the observation of charmed hadrons. These are only produced via the process $\gamma^* + g \rightarrow c + \bar{c}$. Other sources like intrinsic charm in the nucleon or the production of charmed hadrons in the fragmentation process can be neglected at the CMS energy $\sqrt{s} = 300$GeV of the experiment.

Double spin cross section asymmetries of charmed mesons provide thus a direct access to the gluon polarization $\Delta g/g$. To measure $\Delta g/g$ (and in parallel quark helicity distributions) COMPASS uses a 160 GeV polarized muon beam and a polarized solid state target. The scattered muon and produced hadrons are detected in a two stage spectrometer with good particle identification.

In the presentation recent results of the COMPASS collaboration will be presented.