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overview of the COMPASS GPD program

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In 2016 and 2017 exclusive reaction measurements were performed at the M2 beamline of the CERN SPS using 160 GeV positively and negatively charged muon beams scattering of a liquid hydrogen target. The Deeply Virtual Compton Scattering (DVCS) is the golden exclusive reaction to study Generalized Parton Distributions (GPDs). For this reaction, the scattered muons and the produced real photons were detected by the COMPASS spectrometer, which was supplemented by an additional electromagnetic calorimeter for the detection of large-angle photons. To insure the exclusivity of the reaction, the recoil protons were detected by the CAMERA detector, which measures the time of flight between two barrels of scintillators surrounding the 2.5 m long target. We will summarize the status of the analysis of the data and present results from the one-month 2012 pilot run which represents about one tenth of the total statistics collected in 2016-17.

By summing up the DVCS cross sections when using either a positive or a negative muon beam the total DVCS cross section and its $|t|$ -dependence can be extracted. From this measurement mainly related to the GPD H , a first estimate of the transverse extension of partons in the proton probed in the sea-quark domain is determined. We will also report on the cross section for exclusive π^0 production and its $|t|$ and azimuthal dependence as well as on the spin density matrix elements for exclusive omega meson production. These measurements are aiming to constrain GPDs, in particular the chiral-odd (transversity) GPDs H_T and \tilde{E}_T .

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