

HERMES measurement of the Collins and Sivers asymmetries from a transversely polarized hydrogen target

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In 2005 the HERMES collaboration published first evidence for azimuthal single-spin asymmetries in semi-inclusive production of charged pions on a transversely polarised hydrogen target.

The measured asymmetries are caused by both the Collins and the Sivers mechanisms. Their distinctive Fourier components provide signals to previously unmeasured quantities: the transversity quark distribution in conjunction with the Collins fragmentation function (Collins mechanism/asymmetry) and the Sivers parton distribution (Sivers mechanism/asymmetry). The transversity distribution will provide a detailed insight into the relativistic nature of the quarks inside the nucleon. Continuous theoretical work could relate the Sivers function to the contribution of the orbital angular momentum of both quarks and gluons to the spin of the nucleon.

The presented results for charged pions have a much higher statistical significance than the published data, and are accompanied by the measurement of the Collins and Sivers asymmetries for charged kaons.

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