

HANDEDNESS INSIDE THE PROTON

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Abstract

There exists an experimental indication –a $\cos 2\phi$ azimuthal asymmetry in the Drell-Yan process– for nonzero transversity of quarks inside *unpolarized* hadrons. The idea is that transverse polarization of a noncollinear quark inside an unpolarized hadron in principle can have a preferred direction and therefore, does not need to average to zero. This preferred direction signals an intrinsic handedness. For instance expressed in the infinite momentum frame this means that the transverse polarization is orthogonal to the directions of the proton and the noncollinear quark itself.

The purpose of this talk is to review the theoretical aspects of such a distribution function [1–3] and to point out its experimental signatures. In particular, unpolarized and single spin asymmetries will be discussed for the Drell-Yan process and semi-inclusive DIS. Important in the latter case are polarized Λ production observables. Special emphasis will be put on how to distinguish the various asymmetries compared to those of other mechanisms, like the Sivers effect.

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