SELECTED HERMES RESULTS ON SEMI-INCLUSIVE MESON PRODUCTION

Klaus Rith (on behalf of the HERMES collaboration)

University of Erlangen-Nürnberg/Germany

The HERMES experiment has studied for more than a decade meson production in semi-inclusive deep-inelastic scattering using a 27.6 GeV electron/positron beam incident on unpolarised and polarised gas targets internal to the HERA lepton storage ring. Results will be presented for multiplicities of charged pions and kaons from unpolarised hydrogen and deuterium targets. These very precise data will significantly enhance our understanding of the fragmentation of quarks into final state hadrons in deep-inelastic scattering. Other examples presented in this contribution are azimuthal asymmetries in the angular distributions of these mesons that allow to extract informations about various novel quark distribution and fragmentation functions. Such asymmetries in unpolarised deep-inelastic scattering are related to the so-called Cahn effect and the Boer-Mulders distribution function of transversely polarized quarks in an unpolarised nucleon in conjunction with the spin-dependent Collins fragmentation function. Specific angular modulations from a transversely polarised target are related to the quark transversity distribution of transversely polarised quarks in a transversely polarised nucleon and also to the Sivers distribution function that describes the distribution of unpolarised quarks in a transversely polarized nucleon and can be related to orbital angular momenta of quarks.

E-mail: klaus.rith@desy.de