Exclusive Electroproduction of Vector Mesons at HERMES

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Abstract

Recent preliminary Hermes measurements are presented on exclusive diffractive production of light vector mesons (ρ^0, ω and ϕ). To identify the production mechanisms of vector mesons, the longitudinal components of those cross sections are compared with models based on generalized parton distribution functions. Results on double-spin asymmetries are shown for exclusive diffractive production and quasi-real photoproduction of ρ^0 and ϕ mesons from proton and deuterium targets. The spin density matrix elements for exclusive diffractive ρ^0 and ϕ production have been determined and will be discussed in comparison to results obtained at higher energies. In addition first results on an azimuthal single spin asymmetry of ρ^0 production from a longitudinally polarized target are expected to be presented. Using ^{2}H and ^{1}4N targets, the nuclear transparency of ρ^0 production has been measured in dependence of the coherent length and momentum transfer Q^2. This newest data have been investigated on a possible onset of color transparency and are compared with recent theoretical calculations.