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Spin Density Matrix Elements in hard exclusive light vector meson muoproduction at COMPASS

Tuesday 28 March 2023 09:00 (20 minutes)

We will present results on Spin Density Matrix Elements (SDMEs) measured in hard exclusive muoproduction of ρ^0, ω and ϕ mesons on the proton at COMPASS using 160 GeV/c polarised μ^+ and μ^- beams scattering off a liquid hydrogen target. The measurements cover the range 5 GeV/c^2 $< W <$ 17 GeV/c^2, 1.0 (GeV/c)^2 $< Q^2 <$ 10.0 (GeV/c)^2 and 0.01 (GeV/c)^2 $< p_T^2 <$ 0.5 (GeV/c)^2. Here, Q^2 denotes the virtuality of exchanged photon, W the mass of final hadronic system and p_T the transverse momentum of the vector meson with respect to the virtual-photon direction. The measured non-zero SDMEs for transitions of transversely polarised virtual photons to longitudinally polarised vector mesons ($\gamma_T \to V_L$) indicate a violation of s-channel helicity conservation. Additionally, for ρ^0 and ϕ production we observe a dominant contribution of natural-parity-exchange (NPE) transitions and a small contribution of unnatural-parity-exchange (UPE) transitions. On the contrary the UPE contribution for ω production is significant and it decreases with increasing W, being still non-negligible at the largest W values accessible at COMPASS. The results provide an important input for modelling Generalised Parton Distribution (GPDs). In particular, they may allow to evaluate in a model-dependent way the role of parton helicity-flip GPDs (”transversity GPDs”) in exclusive vector meson production.

Submitted on behalf of a Collaboration?

Yes

Participate in poster competition?

No

Primary author: Prof. SANDACZ, Andrzej (National Centre for Nuclear Research (PL))

Co-author: ANDRIEUX, Vincent (Univ. Illinois at Urbana Champaign (US))

Presenter: ANDRIEUX, Vincent (Univ. Illinois at Urbana Champaign (US))

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