

## Spin-density matrix elements in hard exclusive muoproduction of $\omega$ mesons at COMPASS

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Spin density matrix elements (SDMEs) have been determined for exclusive  $\omega$  meson production on unpolarized protons, in the COMPASS kinematic region of  $1.0 \text{ (GeV}/c^2) < Q^2 < 10.0 \text{ (GeV}/c^2)$ ,  $5.0 \text{ GeV}/c^2 < W < 17.0 \text{ GeV}/c^2$  and  $0.01 \text{ (GeV}/c^2) < p_T^2 < 0.5 \text{ (GeV}/c^2)$  which corresponds to  $\langle Q^2 \rangle = 2.1 \text{-(GeV}/c^2)$ ,  $\langle W \rangle = 7.6 \text{-GeV}/c^2$  and  $\langle p_T^2 \rangle = 0.16 \text{-(GeV}/c^2)$  mean values. The analysis is based on data taken in 2012 with the 160 GeV muon beam and the liquid hydrogen target. Using extracted SDMEs the contribution of unnatural parity exchange amplitudes, the longitudinal-to-transverse cross section ratio, and the hypothesis of s-channel helicity conservation (SCHC) were studied. A sizable contribution of unnatural parity exchange amplitudes is found for the exclusive  $\omega$  meson muoproduction, although there is a clear indication of its decrease with increasing  $W$ . Certain matrix elements e.g.  $r_{00}^5$  corresponding to transition  $\gamma_T^* \rightarrow V_L$  indicate violation of SCHC in exclusive  $\omega$  production.

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