Exclusive electroproduction of $p^0$ in the process $\gamma^* N \rightarrow p^0 N$ provides information on reaction mechanism and nucleon structure.

Study of exclusive vector meson production offers the possibility of constraining Generalized Parton Distribution (GPD).

The present work is a continuation of the Spin Density Matrix Elements (SDME) analysis published at EPJ C62(2009) 659.

SDME can be expressed through $T$ and $U$ with both high-Q asymptotic and one-pion-exchange dominance.

The amplitudes obey the following symmetry relation: $\lambda N_\rho \rightarrow \lambda' N_\rho'$ with $\rho$ representing isotropic input Monte-Carlo distribution as modified by the HERMES acceptance, while the red lines are the results of the fit (right panel). Amplitudes are extracted directly from the measured angular distribution.

Angular distribution $M(\Phi)$ depends linearly on SDMEs $C_{N}\chi_{N}$ and beam polarization $P_{B}$.

SDMEs are expressed through 5 amplitude ratios, i.e. 9 real parameters. The amplitudes are free parameters in fitting procedure.

The amplitudes are extracted for $4 \times 4$ of $Q^{2}$ and $t$-bins.

The amplitudes are extracted with the same binned maximum likelihood method as SDMEs EPJ C62(2009) 659.

There is no difference between proton and deuteron for amplitude ratio $T_{00}/T_{00}$.

pQCD predicts the following dependence: $T_{00}/T_{00} \sim M_{Q}^{2}$.

We do not see either $Q^{2}$ or $t$ dependence of $T_{00}/T_{00}$ for both proton and deuteron data and with higher precision than that obtained in SDME method.

Comparison of $H_{1}$ and H1 results.

Study of electroproduction of $p^0$ vector meson on proton and deuteron enables to obtain ratios of helicity amplitudes, and investigate their kinematic dependencies.

The kinematic dependence of $O(1/T_{00})$ $R(U_{11}/T_{00})$ are in contradiction with high-Q asymptotics behavior predicted in pQCD.

The amplitude ratios for deuteron are compatible with those for protons.

The UPE signal is seen here with very high significance for both proton and deuteron data.

Finally, we can approximate the SDMEs through 9 real parameters, namely: $R(T_{00}/T_{00})$, $R(T_{00}/T_{00})$, $R(T_{00}/T_{00})$, $R(T_{00}/T_{00})$, $R(T_{00}/T_{00})$, $R(T_{00}/T_{00})$, $R(T_{00}/T_{00})$, $R(T_{00}/T_{00})$, $R(T_{00}/T_{00})$.

We shall afterward notation $T_{00} = T_{00}$, $T_{00} = T_{00}$, $T_{00} = T_{00}$, $T_{00} = T_{00}$, $T_{00} = T_{00}$, $T_{00} = T_{00}$, $T_{00} = T_{00}$, $T_{00} = T_{00}$, $T_{00} = T_{00}$.

Deuterium data and with higher precision than that obtained in SDME method.

Excellent agreement of amplitude ratios extracted by H1 and HERMES.