• Exclusive electroproduction of vector mesons in the process $\gamma^* + N \rightarrow V + N'\ (V=\rho,\ \phi, \ \omega)$ provides information on reaction mechanism and nucleon structure.

• Test of S-channel Helicity Conservation hypothesis (SCHC).

• Possibility to distinguish between contribution of N(U)natural Parity Exchange(NPE, UPE).

• Direct extraction of helicity amplitudes ratios of the reaction.

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

**Experimental observables. Spin Density Matrices in reaction $e + N \rightarrow e' + V + N$.**

- $e \rightarrow e' + \gamma^*$ (GPD). Spin-density matrix of the virtual photon:

  $\rho_{\gamma K L}(t) = \rho_{\gamma K L}^U(t) + \rho_{\gamma K L}^D(t)$ ($U$ - unpolarized, $L$ - polarized beam)

- $\gamma^* + N \rightarrow \rho(0) + N \rightarrow \pi^+(K^-) + \pi^-(K^+) + N$ (NDC).

- Spin Density Matrix Elements (SDMEs): $\rho_{\gamma K L}^U(t) \sim \rho(t; f^N)\&^{fN}(t)$

Vector meson spin density matrix $\rho(t)$ and SDMEs are expressed in terms of the photon matrix $\rho(t)$ and helicity amplitudes $\rho_{\gamma K L}(t)$.

$\rho_{\gamma K L}(t)$ are bilinear combination of helicity amplitudes.

- For longitudinally polarized beam and unpolarized target there are 23 SDMEs (10 unpolarized and 8 polarized) which are determined from the fit of angular distribution of kaons from decay $\phi \rightarrow K^* K^-$ or pions from $\rho^0 \rightarrow \pi^\pm \pi^\mp$.

- Signal of UP in SDME method

  $\sum_{N} A_{\gamma K L}^N(t) \rightarrow 2 \sum_{N} A_{\gamma K L}^N(t) = \sum_{N} A_{\gamma K L}^N(t) + \sum_{N} A_{\gamma K L}^N(t)$

$\sum_{N}$ is summed over all nuclear targets.

- Signal of pQCD in production plane.

  $\gamma^* + N \rightarrow \rho + N$, with $t = 1.00 \pm 0.03 GeV^2$ and $Q^2 \geq 2.0 GeV^2$.

**Comparison of SDMEs for the integrated data on exclusive $\rho^0$ and $\phi$ production**

- Signal of UP in SDME method

  $\sum_{N} A_{\gamma K L}^N(t) \rightarrow 2 \sum_{N} A_{\gamma K L}^N(t) = \sum_{N} A_{\gamma K L}^N(t) + \sum_{N} A_{\gamma K L}^N(t)$

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- Signal of pQCD in production plane.

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**Comparison of experimental value of $\lambda^{\phi}(0)\&^{(0)}(0)$ with theoretical predictions based on handbag model of S. V. Goloskokov and P.Kroll.**

**Comparison of experimental value of $\lambda^{\phi}(0)\&^{(0)}(0)$ with theoretical predictions based on handbag model of S. V. Goloskokov and P.Kroll.**

The solid, dashed, dotted and dash-dotted lines represent the results for different variants. The shaded band indicates the theoretical uncertainty for one variant. The other variants have similar uncertainties.