Polarization transfer in $^4\mathrm{He}(\vec{e}, e'\vec{p})^3\mathrm{H}$
Is the ratio G_{Ep}/G_{Mp} modified in medium ?

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work done in collaboration with

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Polarization transfer & nucleon form factors

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- $A(\vec{e}, e'\vec{p})$ measurements may provide information on possible medium modifications of the proton form factors

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▷ Modifications strongly constrained by y-scaling analysis of inclusive data

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- Analysis inherently model dependent. Calculations carried out within different approaches, including correlations, two-body currents and full final state interactions (FSI), needed.

Summary of our theoretical approach

▷ realistic variational bound state wf's (A18 + UIX Hamiltonian)

▷ fi nal state written in the form

$$\psi^{(-)}_{\mathbf{k}\sigma;\sigma_3} = \frac{1}{\sqrt{4}} \sum_{\mathrm{P}} (-)^{\mathrm{P}} \left[\eta^{(-)}_{\mathbf{k}\sigma}(i;p)\phi_{\sigma_3}(jkl;{}^3\mathrm{H}) + \eta^{(-)}_{\mathbf{k}\sigma}(i;n)\phi_{\sigma_3}(jkl;{}^3\mathrm{He}) \right]$$

▷ $\eta^{(-)}_{\mathbf{k}\sigma}(i;p/n)$ obtained from the optical potential

$$v^{\mathrm{opt}}_T = [v^c(r;E) + (4T-3)v^{c\tau}(r;E)] + [v^b(r;E) + (4T-3)v^{b\tau}(r;E)]\,\mathbf{l}\cdot\mathbf{s}$$

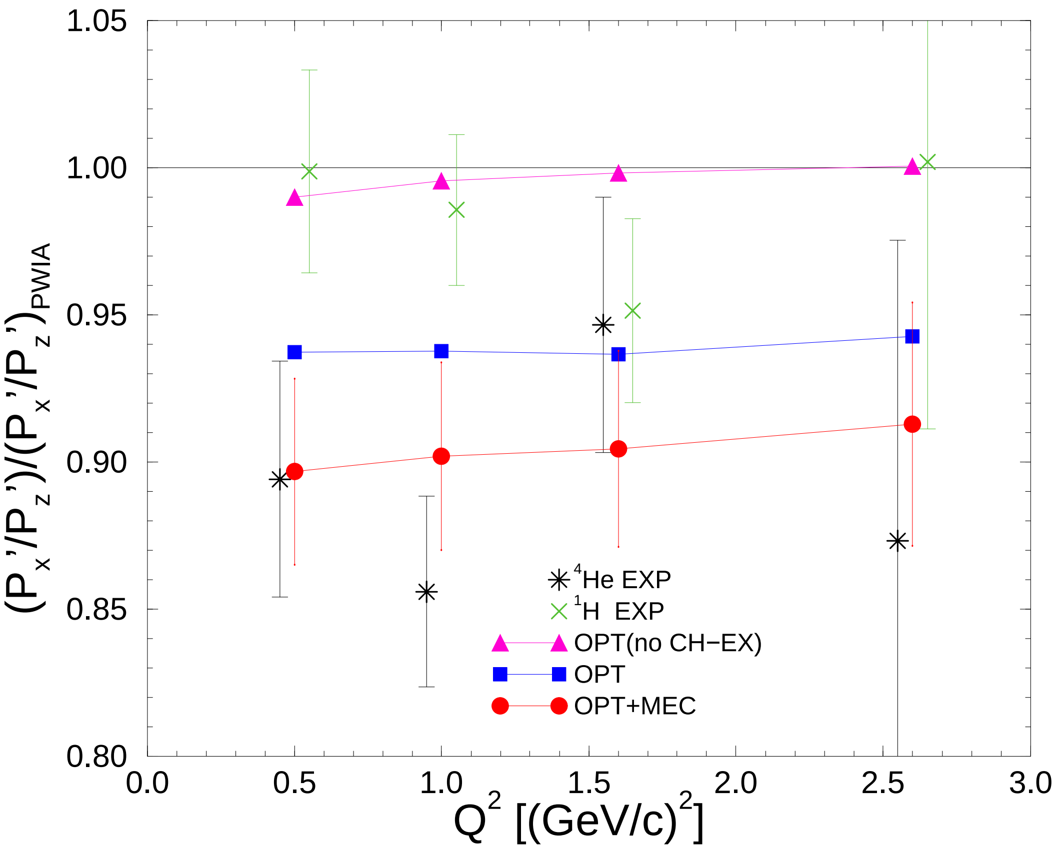
determined by $p + {}^3\mathrm{He} \longrightarrow p + {}^3\mathrm{He}$ and $p + {}^3\mathrm{H} \longrightarrow n + {}^3\mathrm{He}$ data

▷ one- and two-body terms included in the em current operator

▷ matrix elements $\langle \psi^{(-)}_{\mathbf{k}\sigma;\sigma_3} \mid j^\mu \mid {}^4\mathrm{He}\rangle$ computed using Monte Carlo

Results

- Q^2-dependence of the super-ratio R/R_{PWIA}



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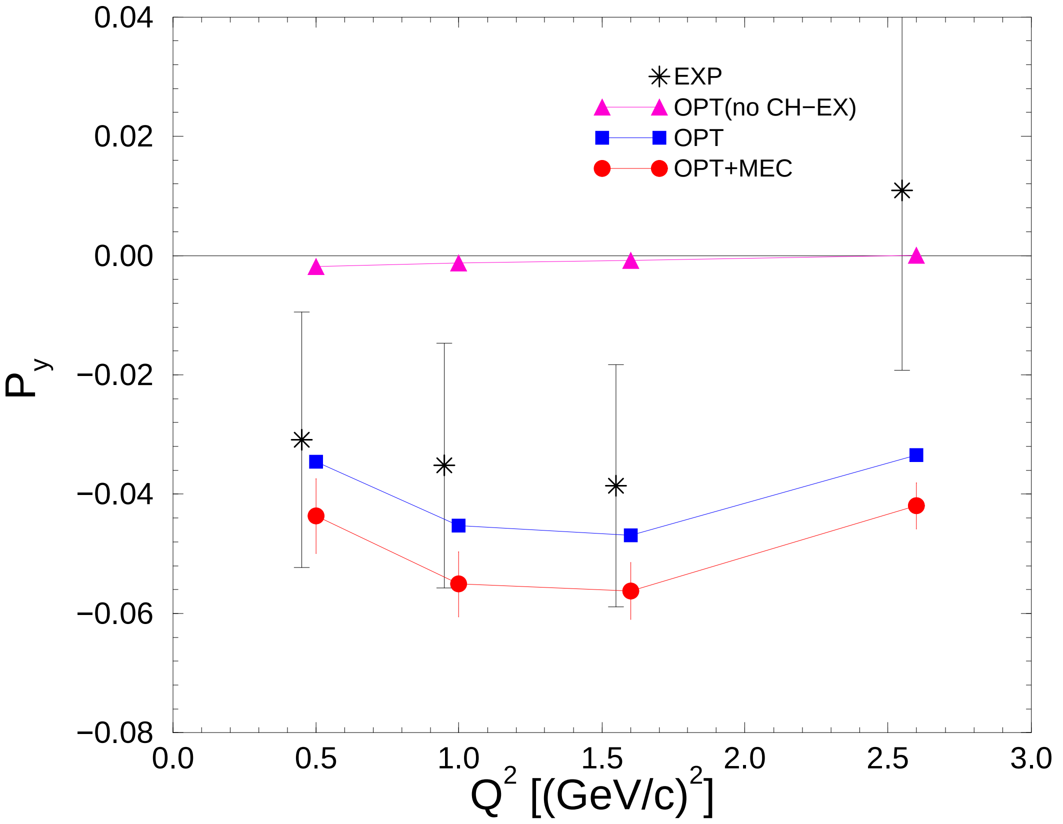
- Q^2-dependence of the induced polarization P_y



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- Within our model no in-medium modification of the proton electromagnetic form factors is needed to reproduce the experimental data.
- Our results support the conclusions of the analyses of the Coulomb sum rule in few-nucleon systems, showing that there is no missing longitudinal strength when the free-space proton form factor is used.