

Proton Generalized Polarizabilities

Fundamental structure constants of the proton

They characterize the response of the proton to an external electric & magnetic field

Ongoing VCS program at JLab

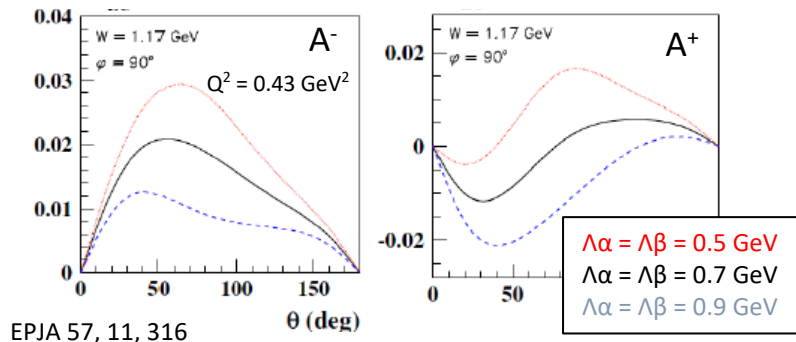
Extend the measurements of the electric & magnetic GPs at JLab utilizing the **existing experimental infrastructure** to improve the precision for the electric & magnetic GPs

Identify the shape of the structure in the electric GP, that is a valuable input for the theory in order to explain the underlying mechanism responsible for the effect.

Future: VCS with a positron beam

Future prospects with a positron beam at JLab:

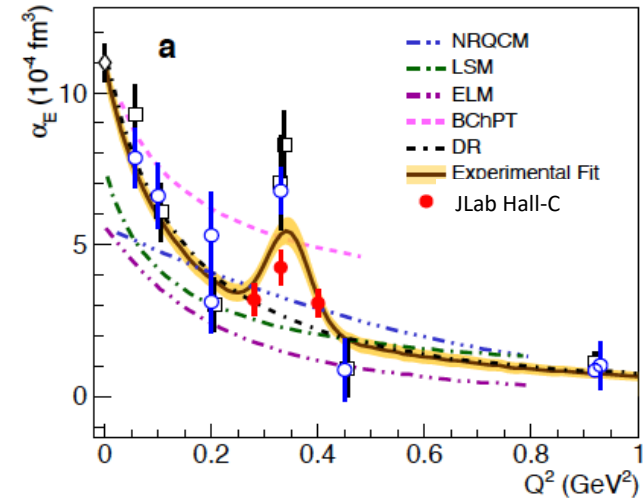
Extend measurements & cross-check GPs via a different method



The electron and positron beam-spin asymmetry as a function of the photon scattering angle

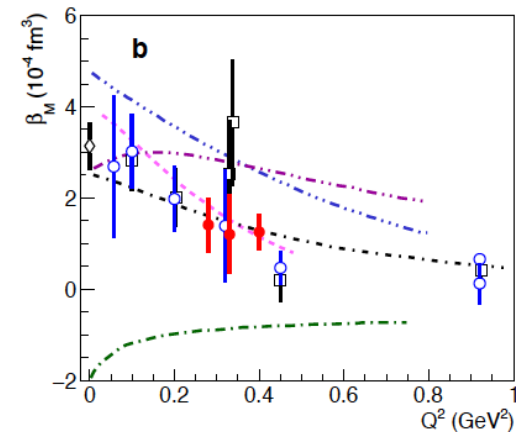
The proton electric generalized polarizability

Electric “stretchability” of the proton



Deviation from monotonic dependence – the theory can't explain it

The proton magnetic generalized polarizability



Decode the **competing paramagnetic and diamagnetic mechanisms** in the proton

Challenges for theory – Strong motivation for Lattice QCD calculations