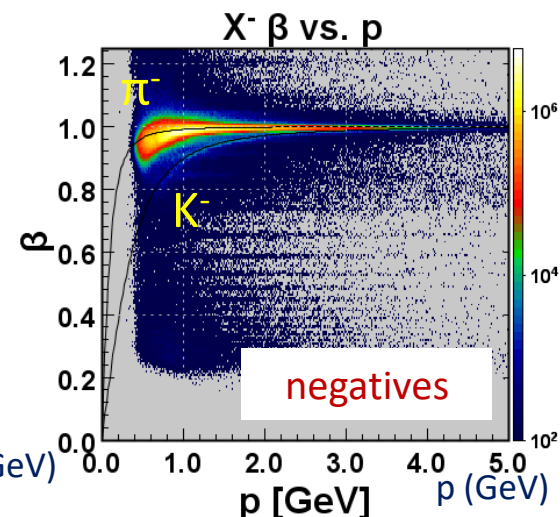
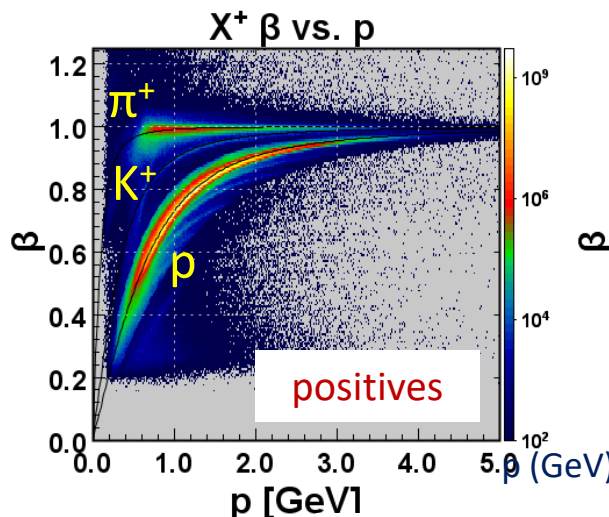
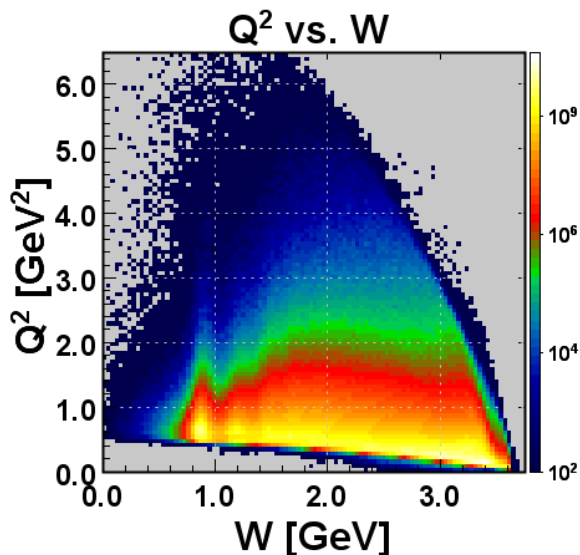


Highlights of CLAS12 Run Group K Experiments

Joshua Artem Tan

on behalf of CLAS Collaboration

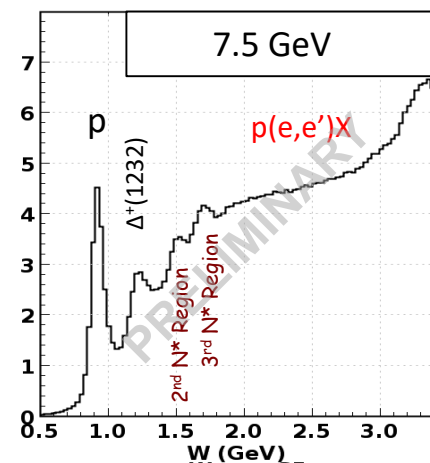
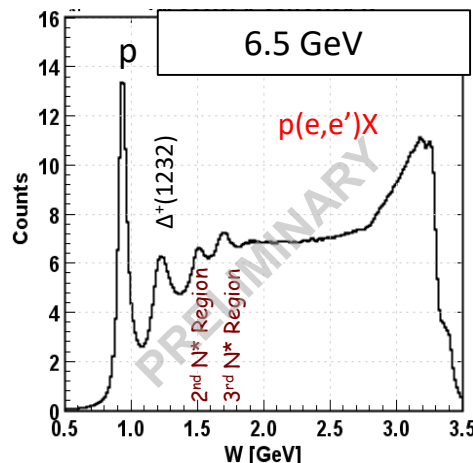
Introduction to CLAS12 Run Group K



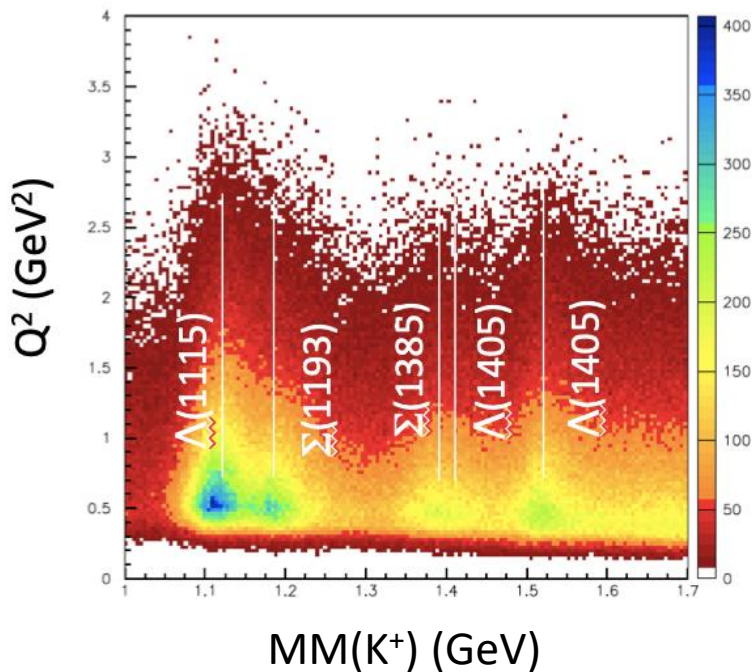
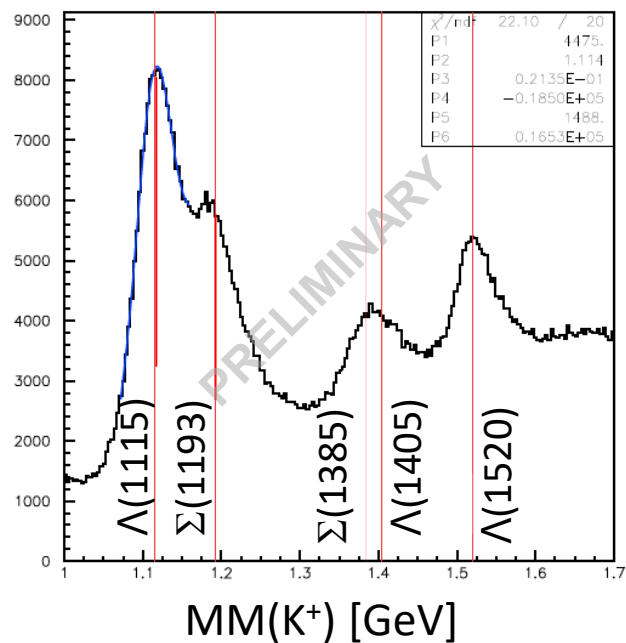
Large acceptance spectrometer covers broad range in Q^2 and W

Run Group K:

- Run at 6.5 GeV and 7.5 GeV in Dec. 2018
- Acquired 12% of approved beam time
- Longitudinally polarized electrons on unpolarized H_2 target



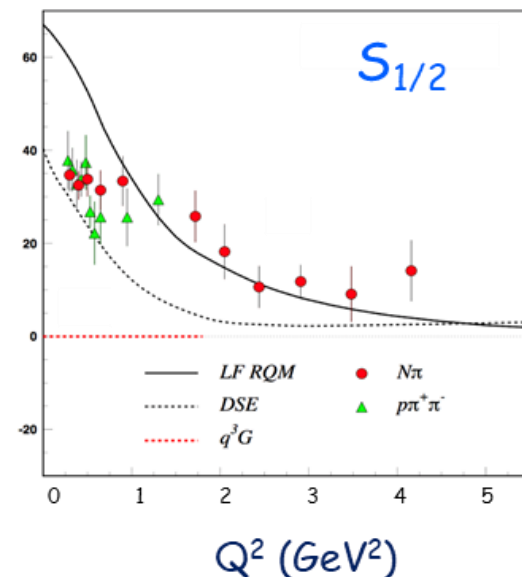
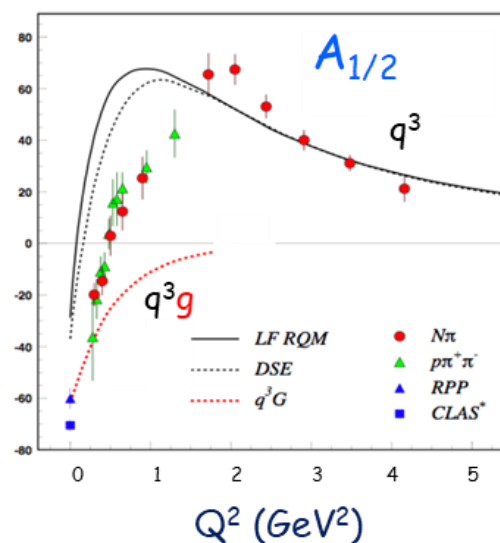
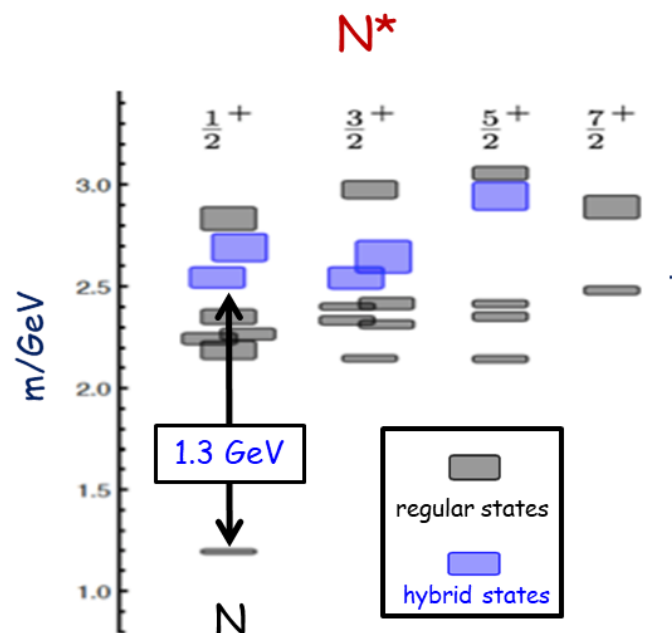
N^* Studies via KY Electroproduction



Run Group K:

- Extraction of $\gamma_v p N^*$ electrocouplings from KY electroproduction off protons.
- Comparison with the results from $N\pi$, $\pi^+\pi^-p$ electroproduction off protons.
- Explore the interplay between meson-baryon and quark degrees of freedom in the N^* structure
- Shed light on the dynamics of dressed quark mass generation and di-quark correlation in different excited nucleon states.
- A unique experimental input on many facets of strong QCD in the generation of excited nucleon states of different structural features.

Search for Hybrid Baryons



JLAB LQCD Group Results $m_\pi = 396 \text{ MeV}$

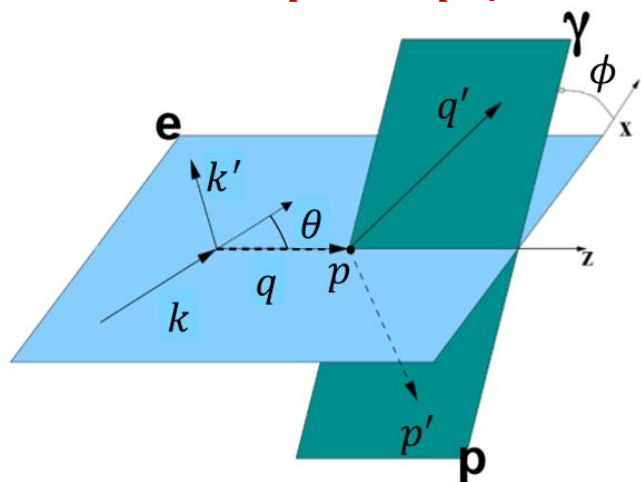
Results and Predictions for $N(1440)1/2^+$

Search for hybrid baryons with CLAS12:

- N^* spectrum from Lattice QCD predicts the existence of hybrid baryons.
- Glue is a possible structural component of excited baryon states
- The Q^2 evolution of the $A^{1/2}$ ($A^{3/2}$) and $S^{1/2}$ electro-couplings may provide the signature of the hybrid nature of the resonances..

Deeply Virtual Compton Scattering

$$ep \rightarrow e'p'\gamma$$

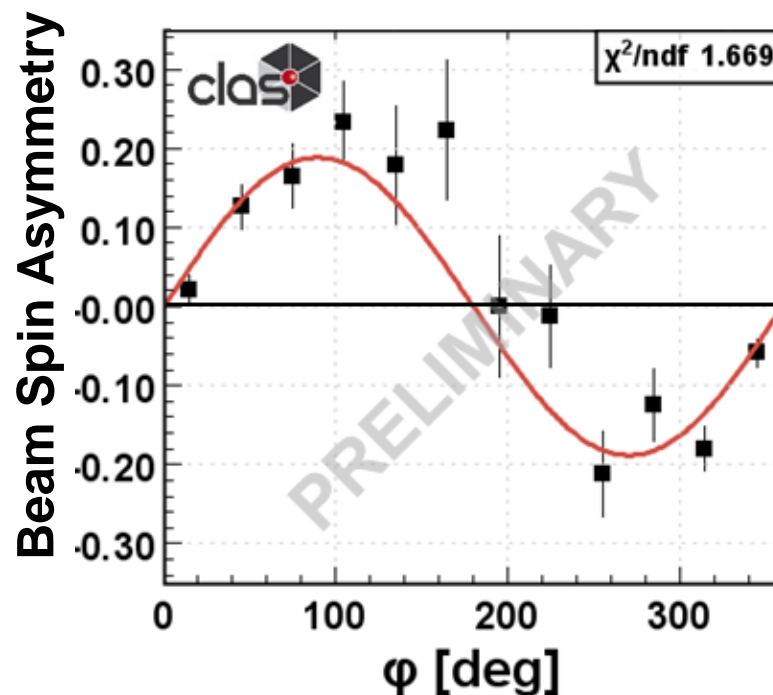


DVCS Kinematics:

$$A_{LU}(\phi) \cong \frac{A \sin(\phi)}{1+B \cos(\phi)}$$

$$A_{LU}(\phi) = \frac{1 N^+(\phi) - N^-(\phi)}{P N^+(\phi) + N^-(\phi)}$$

Beam Spin Asymmetry



Deeply Virtual Compton scattering (DVCS) at 6.5 and 7.5 GeV polarized electron beam:

- Measure beam spin asymmetry describing DVCS and Bethe-Heitler (BH) interference term for unpolarized target
- Access chiral-even GPDs: H^q , \tilde{H}^q , and E^q

Thank You!!!