

DEEP VIRTUAL EXCLUSIVE SCATTERING IN HALL A

CHARLES HYDE

OLD DOMINION UNIVERSITY

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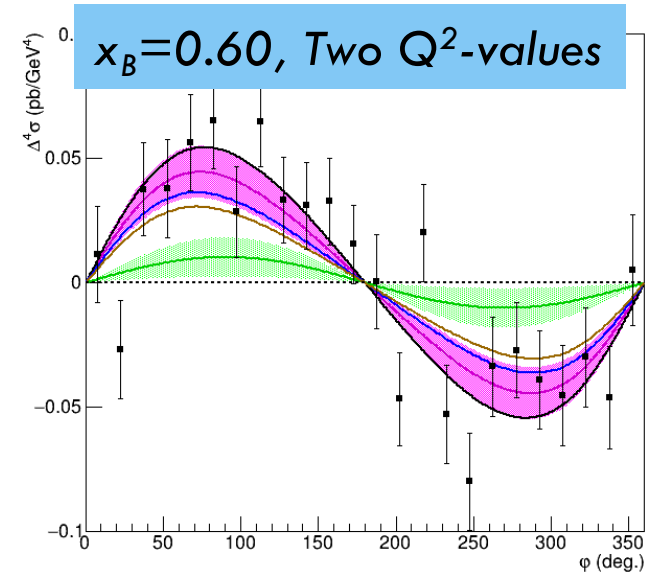
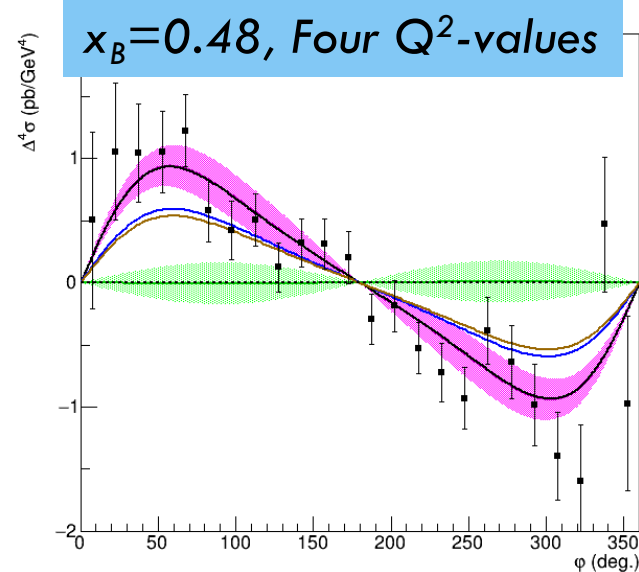
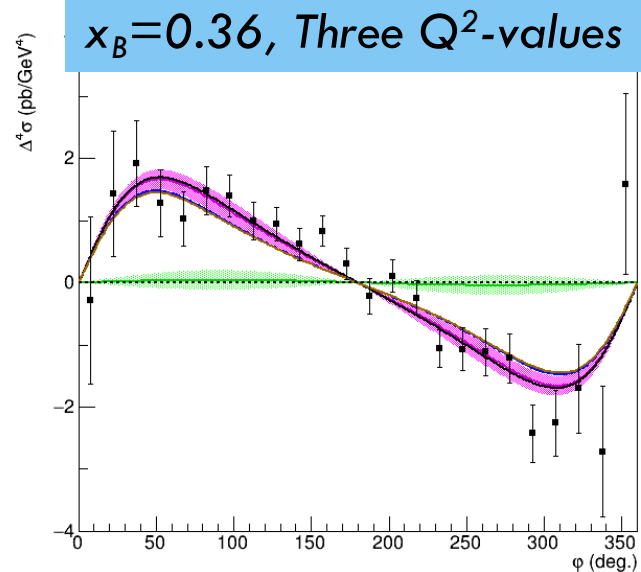
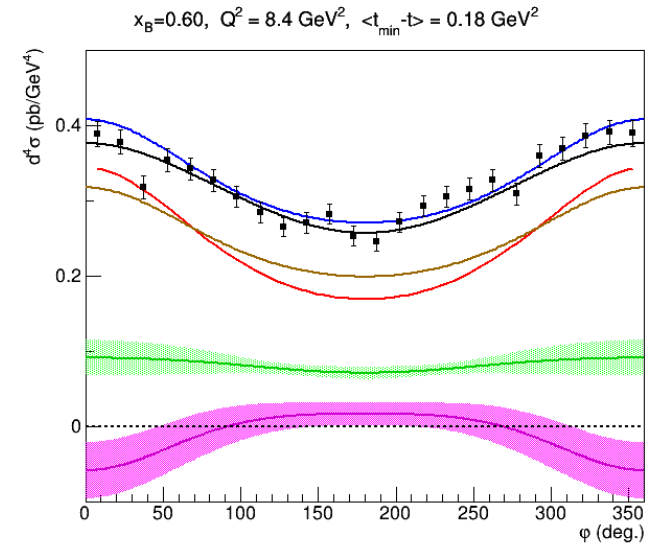
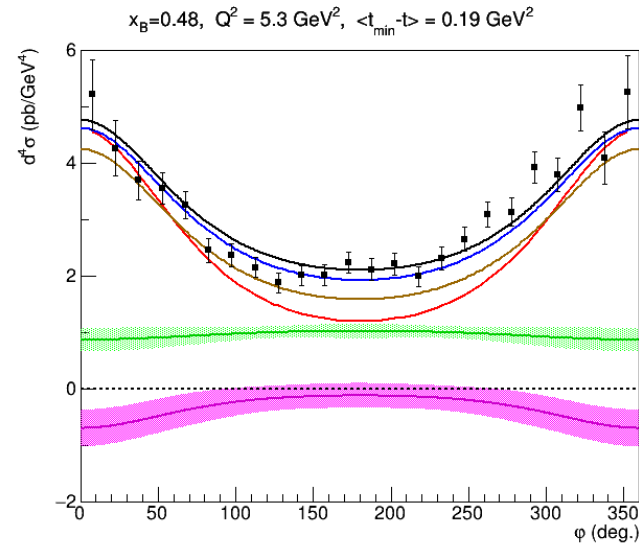
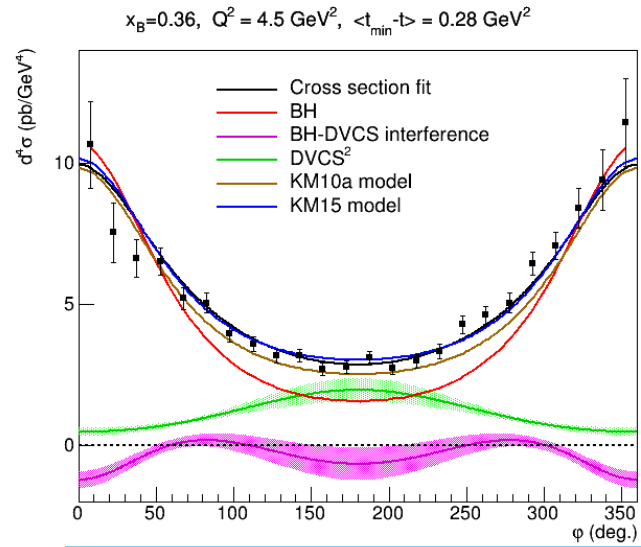
HELICITY-FLIP AND NON-FLIP CROSS SECTIONS

- $H(e,e'\gamma)p$: 6 GeV data published, 12 GeV data in preparation:
- $H(e,e'\pi^0)p$: 6 GeV data published, 12 GeV data submitted to PRL
- $n(e,e'\gamma)n$, $n(e,e'\pi^0)n$ inferred from $D(e,e'\gamma)X$, etc. 6 GeV data published.
No deuterium 12 GeV data.
- Discussion for $D(e,e'\gamma p_S)n$ with Tagged DIS experiment
- Long history of nucleon form factor measurements. Extensions in progress with “Super BigBite Spectrometer (SBS)” 2021—
- Next Generation DVCS experiment in Hall C:
 - Higher Luminosity+ smaller q-vector angle+higher energy electron spectrometer:
Multiple energies for same Q^2, x, t values
 - “Generalized Rosenbluth” separation of $|DVCS|^2$ and $\text{Re}[DVCS^*BH]$

LOTS OF DATA, WHAT TO DO WITH IT?

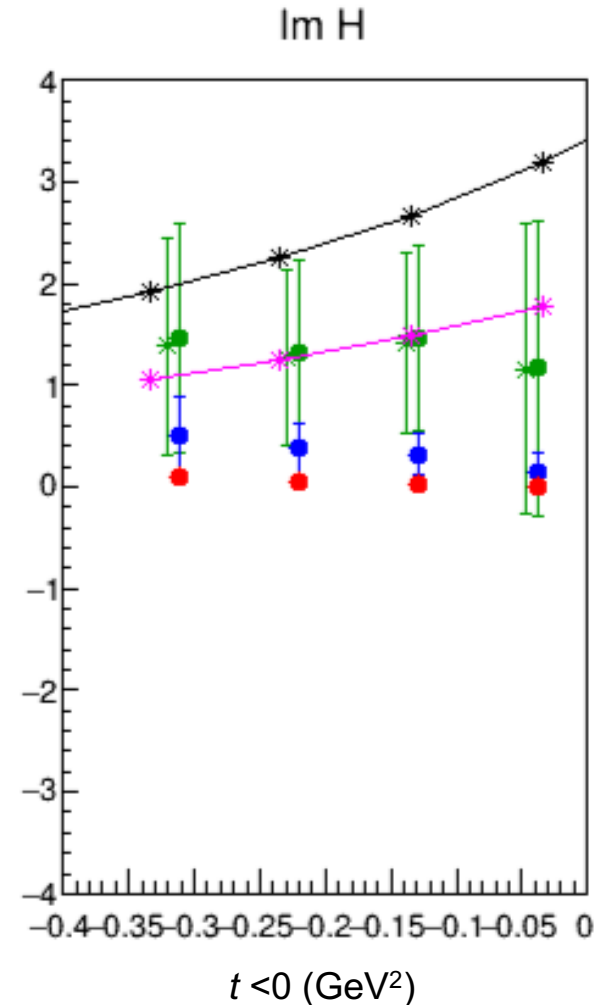
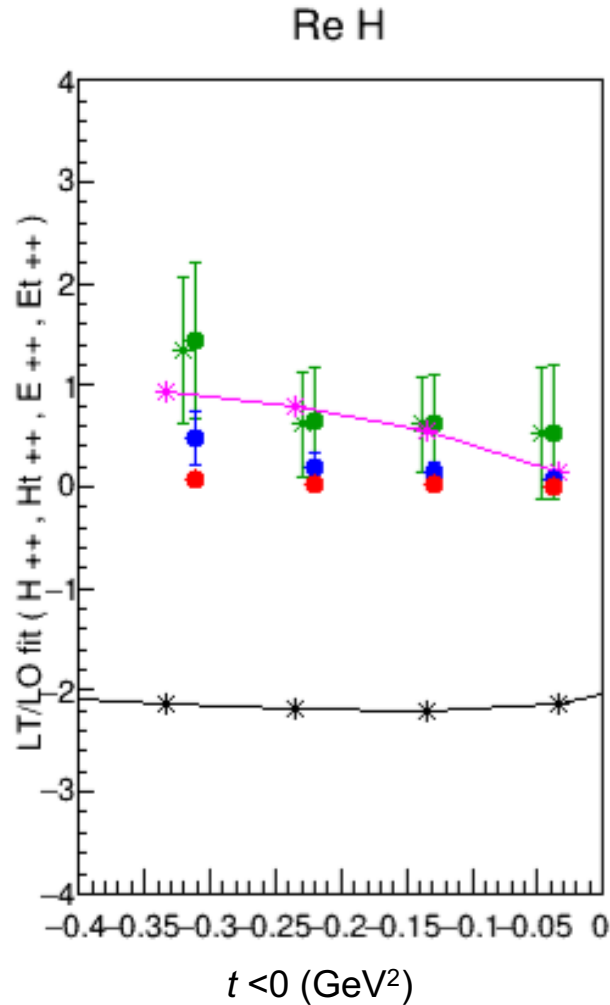
- The full data set cannot be fit with a Dynamic or Kinematic formalism that assumes $t/Q^2 \rightarrow 0$.
- Exact Kinematic factors are known, but terms of order t/Q^2 depend upon the choice of reference frame defining the light-cone:
 - Belitsky Kirchner Mueller (BKM): $(q+q')$ & $(P+P')$
 - Braun Manashov Pirnay (BMP): q & P
- The definitions of “higher twist” (e.g. qgq), and NLO (e.g. gluon) terms are somewhat murky

EXAMPLE DVCS SIMULTANEOUS FITS TO MULTIPLE Q^2 VALUES AT FIXED x_B, t



EXTRACTING FOUR COMPLEX CFFS @ $x_B=0.36$

- STATISTICALLY IT MAKES SENSE, BUT CAN WE DRAW PHYSICAL CONCLUSIONS?



Variations in d.o.f. of fits.

* BMP (+,+) CFFs

• BKM (+,+) CFFs

* BMP (0,+) CFFs

• BKM (0,+) CFFs

* BMP (-,+) CFFs

• BKM (-,+) CFFs

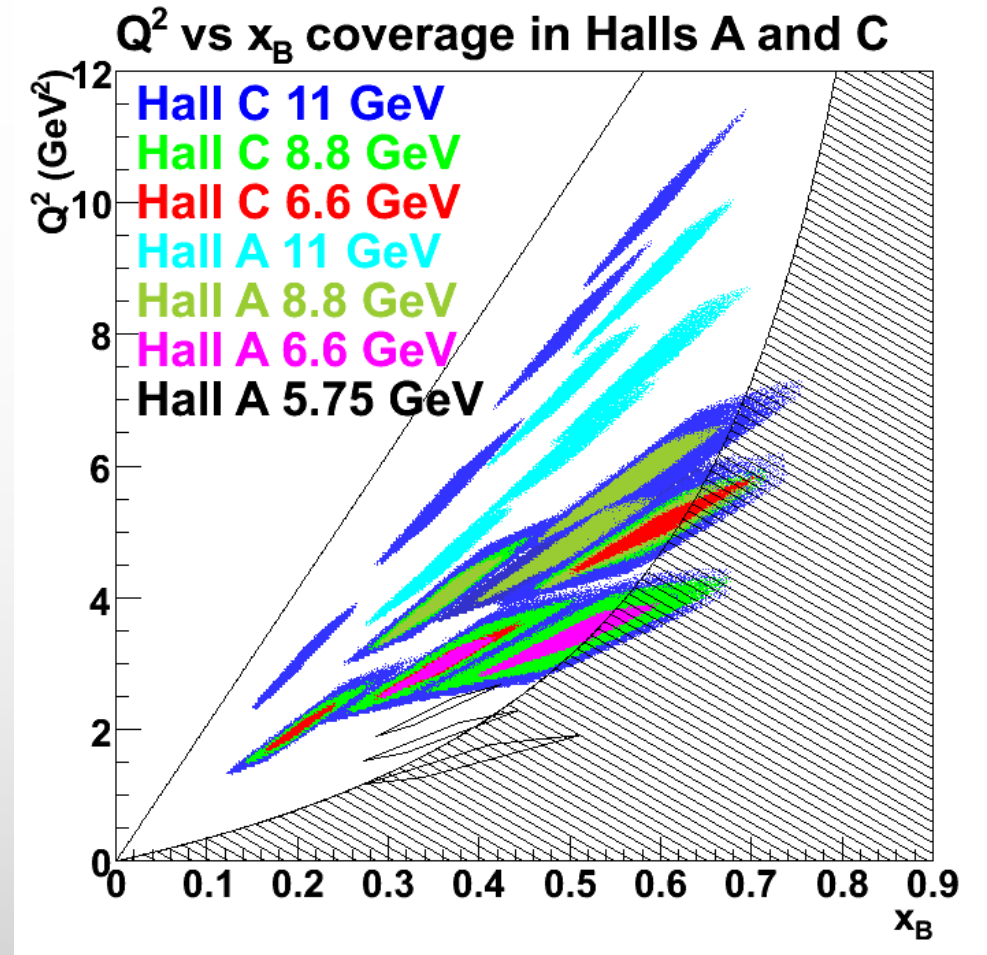
—*— KM model

—*— VGG model

Sign error for $\text{Re}[H]$

CRUCIAL OPEN QUESTION FOR CNF STILL (CRAZY*) AFTER ALL THESE YEARS

- WHAT COMBINATION OF QCD THEORY, MACHINE LEARNING FITTING, AND DATA SCIENCE OPTIMIZATION WILL ENABLE US TO EXTRACT FEMTOGRAPHY FROM OUR CROSS SECTIONS AND ASYMMETRIES?



*Paul Simon, 1975