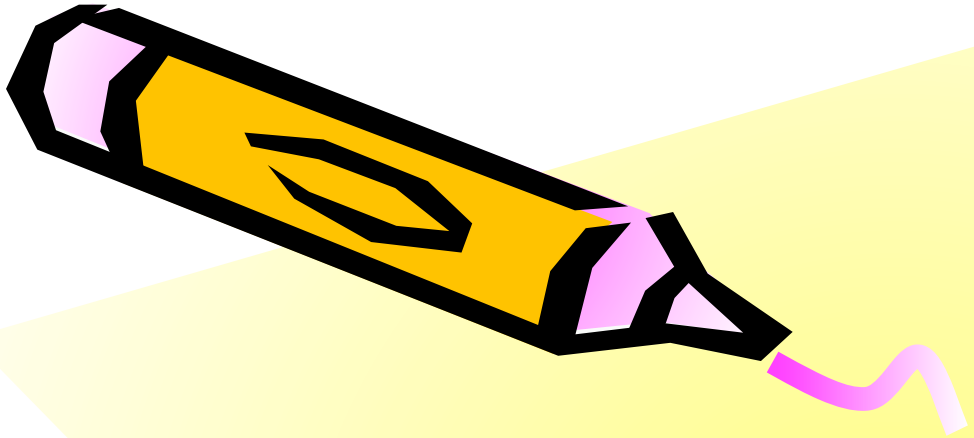
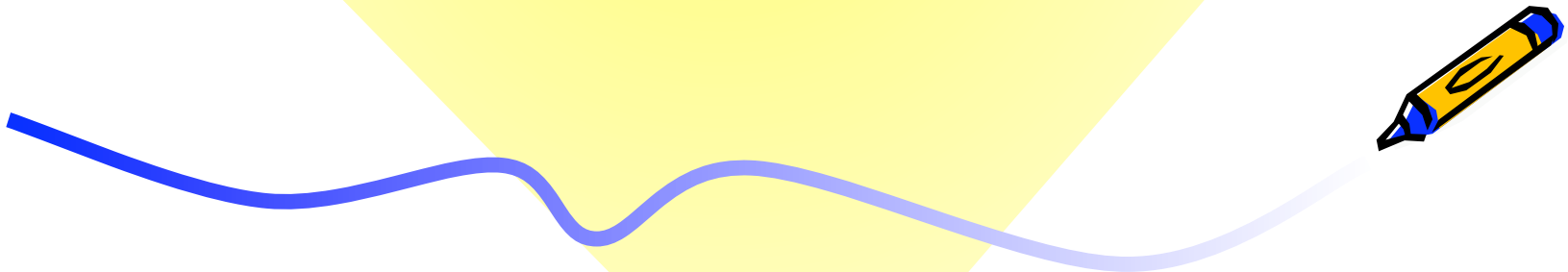


Plans on how to attack what an EIC can do to understand TMDs and GPDs

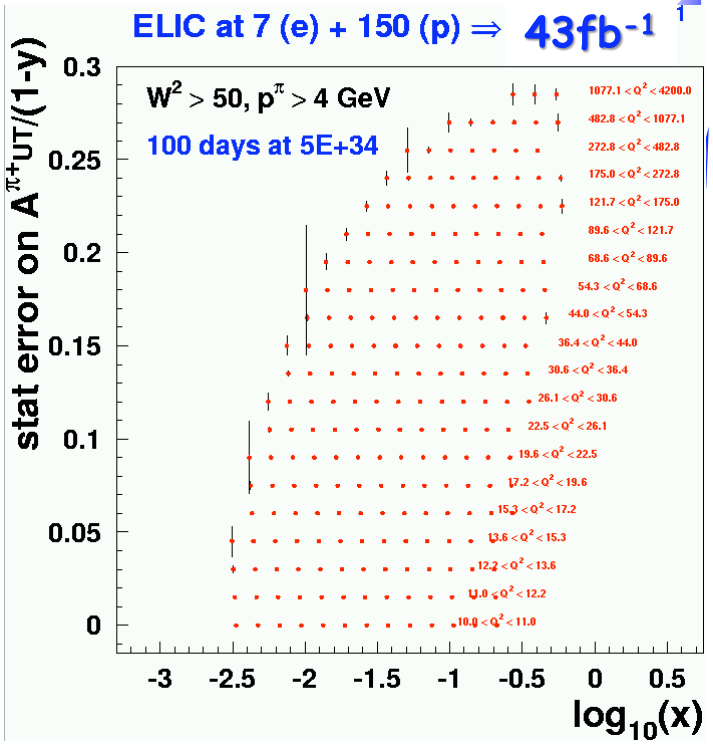


TMDs

- Thomas B is porting the HERMES MC for sivers, transversity, Boer Mulders and Cahn
  - will have it working very soon
  - will work with Alexei Produkin and Peter Schweitzer how to make it even better
  - Goal:
    - create "fake" EIC data and include them in a fit, like the one from the Turino group
      - which kinematics and luminosity do we need
      - current JLab statement is 43fb^{-1}
      - MeRHIC – 1week 4GeVx250GeV:

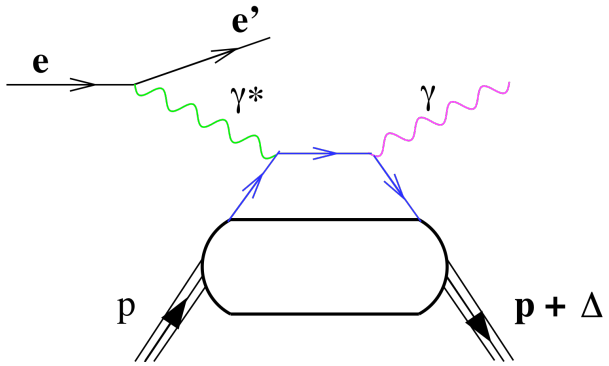
      0.5 * 604800(s in a week) * (1x10^{32} cm^{-2}s^{-1}) = 3*10^{37} cm^{-1} so 30pb^{-1}

      → 1400 weeks !!!!!

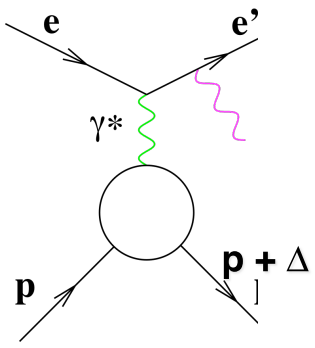


GPDs

DVCS: theoretically cleanest channel
two experimentally undistinguishable processes:



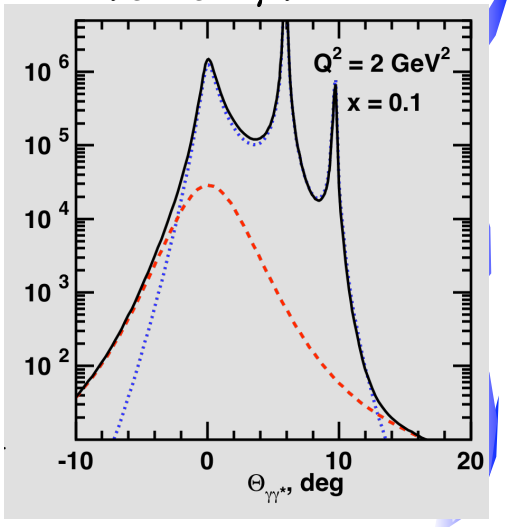
DVCS



Bethe-Heitler (BH)

HERMES / JLAB
kinematics: BH >> DVCS

$d\sigma / dp_e d\Omega_e d\Omega_\gamma (pb / GeVsr^2)$



$$d\sigma \sim \left(\tau^*_{BH}\tau_{DVCS} + \tau^*_{DVCS}\tau_{BH}\right) + |\tau_{BH}|^2 + |\tau_{DVCS}|^2$$

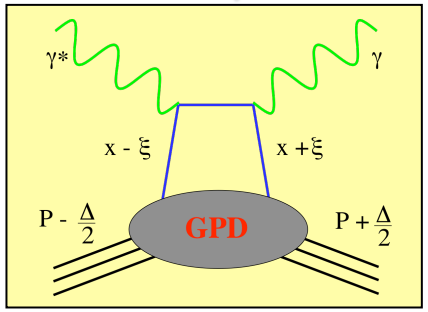
isolate BH-DVCS interference term ⟹ non-zero azimuthal asymmetries

GPDs Introduction

What does GPDs charaterize?

unpolarized	polarized	
$H^q(x,\xi,t)$	$\tilde{H}^q(x,\xi,t)$	conserve nucleon helicity $H^q(x,0,0)=q, \tilde{H}^q(x,0,0)=\Delta q$
$E^q(x,\xi,t)$	$\tilde{E}^q(x,\xi,t)$	flip nucleon helicity not accessible in DIS

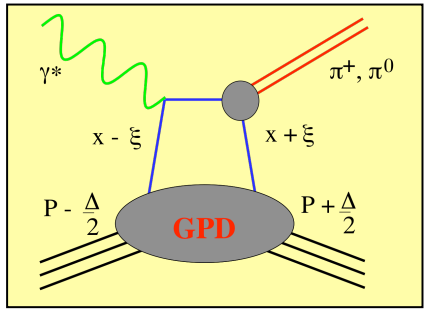
quantum numbers of final state ⟹ select different GPD



DVCS

$\underbrace{H^q}$ $\underbrace{E^q}$ $\underbrace{\tilde{H}^q}$ $\tilde{E}^q$

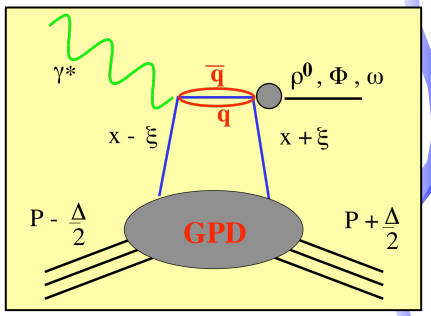
A_C, A_{LU} A_{UT} A_{UL}



pseudo-scaler mesons

$\underbrace{\tilde{H}^q, \tilde{E}^q}$

A_{UT}, $\sigma_{\pi+}$



vector mesons

$\underbrace{H^q, E^q}$

A_{UT}, $\sigma_{\rho,\Phi,\omega}$, SDME

What can an EIC do

- Had phone call with Markus D., Andreas Schaefer & Marco
  - They, Dieter Mueller and K. & K. Kumericki work on extracting GPDs from current data
    - Goal for DVCS:
      - create "pseudo" EIC data and produce impact plots
      - Question how do we produce pseudo DVCS data
        - only 3 MC codes exist
          - VGG → only LO and VGG does not give the sources
          - Freund&McDermott → best choice
          - V. Guzeys, but does not describe any existing data
    - Goal for VM (r, F, J/Psi)
      - r, F problem with unknown wave function
      - J/PSI cleaner but only access to gluons
      - simulation is easier use PYTHIA and reweight events with analyitical fcts. for single spin asymmetries
  - Questions to answer: what are the best observables cross sections vs. asymmetries! Luminosity vs. Q2 reach vs. variety of final states