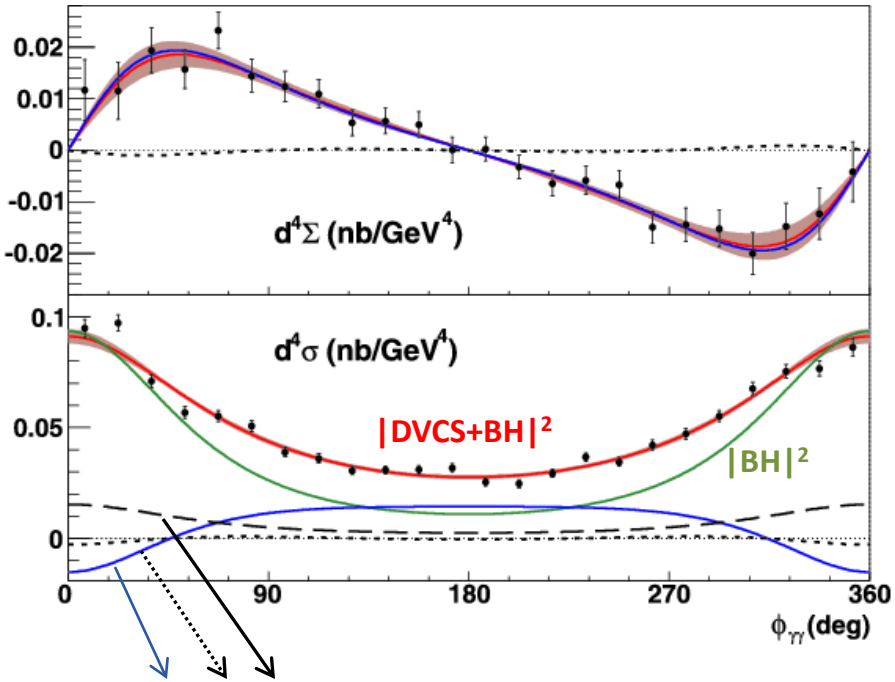
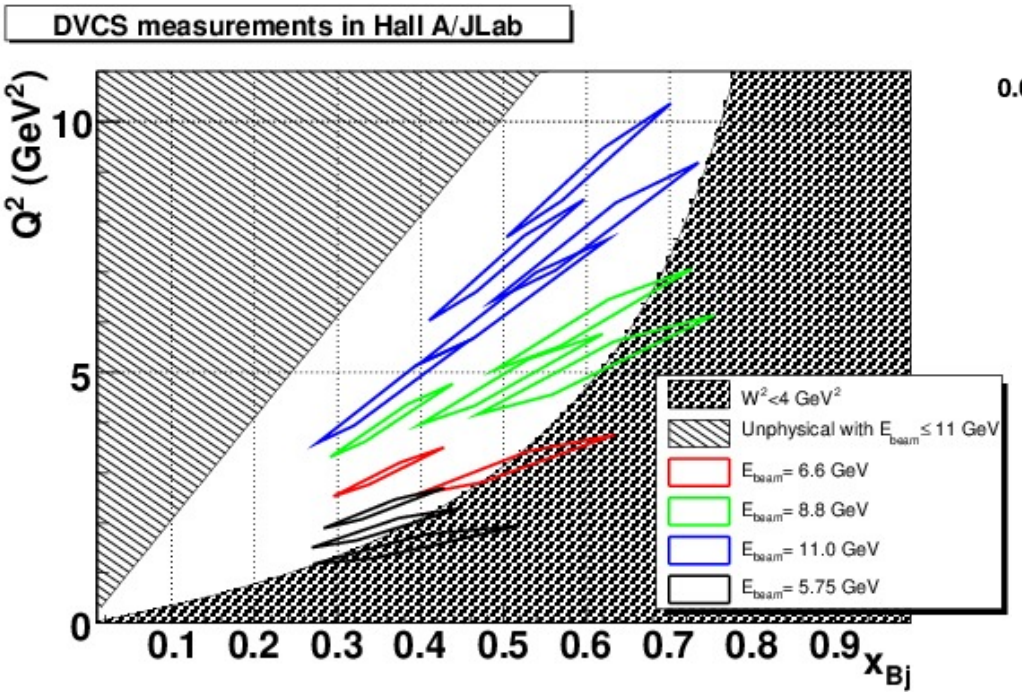
E12-06-114 : DVCS cross-section measurements in Hall A at 11 GeV

Goals:

- Scaling tests of DVCS cross-sections
- Separation of the *Re* and *Im* of the DVCS amplitude
- Large kinematic coverage in Q^2, x_B and t

PRL 97, 262002 (2006)





Angular decomposition of $d^4\sigma$ - $|BH|^2$ provides access to different combinations of GPDs :

- Re (C^I) + C^{DVCS} : twist-2
- Re $(C^I+\Delta C^I)$ + C^{DVCS} : twist-2
- Re (C^I_{eff}) : twist-3

E07-007 & E08-025 DVCS experiments successfully ran in Fall 2010 with 12 GeV equipment

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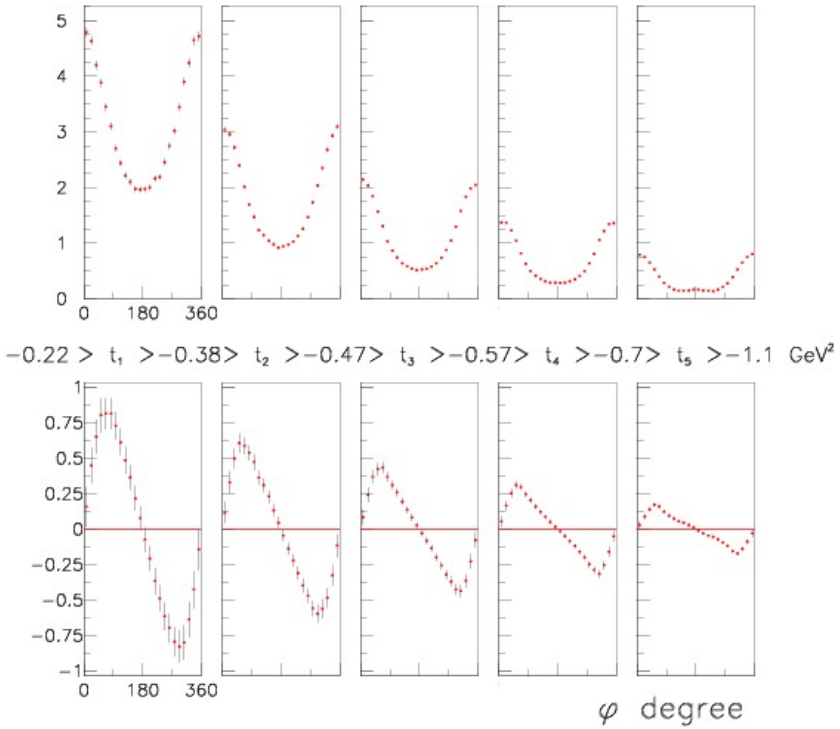
E12-06-114 : Projections and beamtime request

Luminosity: from 4 ·10^{37} to 1·10^{38} Hz/cm^2

E_b = 8.8 GeV, Q^2 = 4.8 GeV^2, x_B = 0.50

Helicity-independent cross sections (pb/GeV4)



Helicity-dependent cross sections (pb/GeV4)

Statistical uncertainty: from 3 % to 5 %

Beamtime request (days)

Q^2 (GeV)	x_B = 0.36	x_B = 0.5	x_B = 0.6
3.0	3		
4.0	2		
4.6	1		
3.1		5	
4.8		4	
6.3		4	
7.2		7	
5.1			13
6.0			16
7.7			13
9.0			20

Total: 88 + 12 (overhead) = 100 days

Systematic uncertainty: 4 %

- 2.5% : acceptance
- 3% : π^0 subtraction

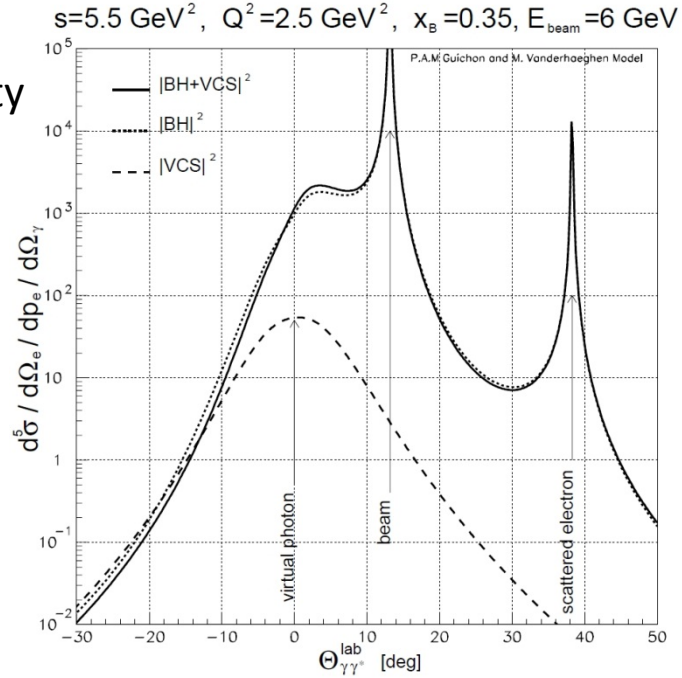
E12-06-114 : Specificities of Hall A measurements

1) Accurate cross-section measurements

- *High luminosity* (10^{38} $cm^{-2}s^{-1}$): 3-5 % statistical uncertainty
- *Well-understood acceptance* : 4% systematic uncertainty

2) High resolution (HRS determines the virtual photon):
angular decomposition needed to extract physics

3) Scaling tests : Q^2 dependence at several fixed values of x_B
Separate sin(ϕ) and sin(2ϕ) terms, and isolate leading twist from higher twist in the sin(ϕ) term.



4) Small bins : *Bethe-Heitler cross section varies very rapidly*

5) Equal statistics in every bin (even at high Q^2)

Cross-section measurements is the only unambiguous way to separate higher twist contributions to DVCS

All equipment ready: able to take data as soon as beam is available, even at E<11 GeV

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