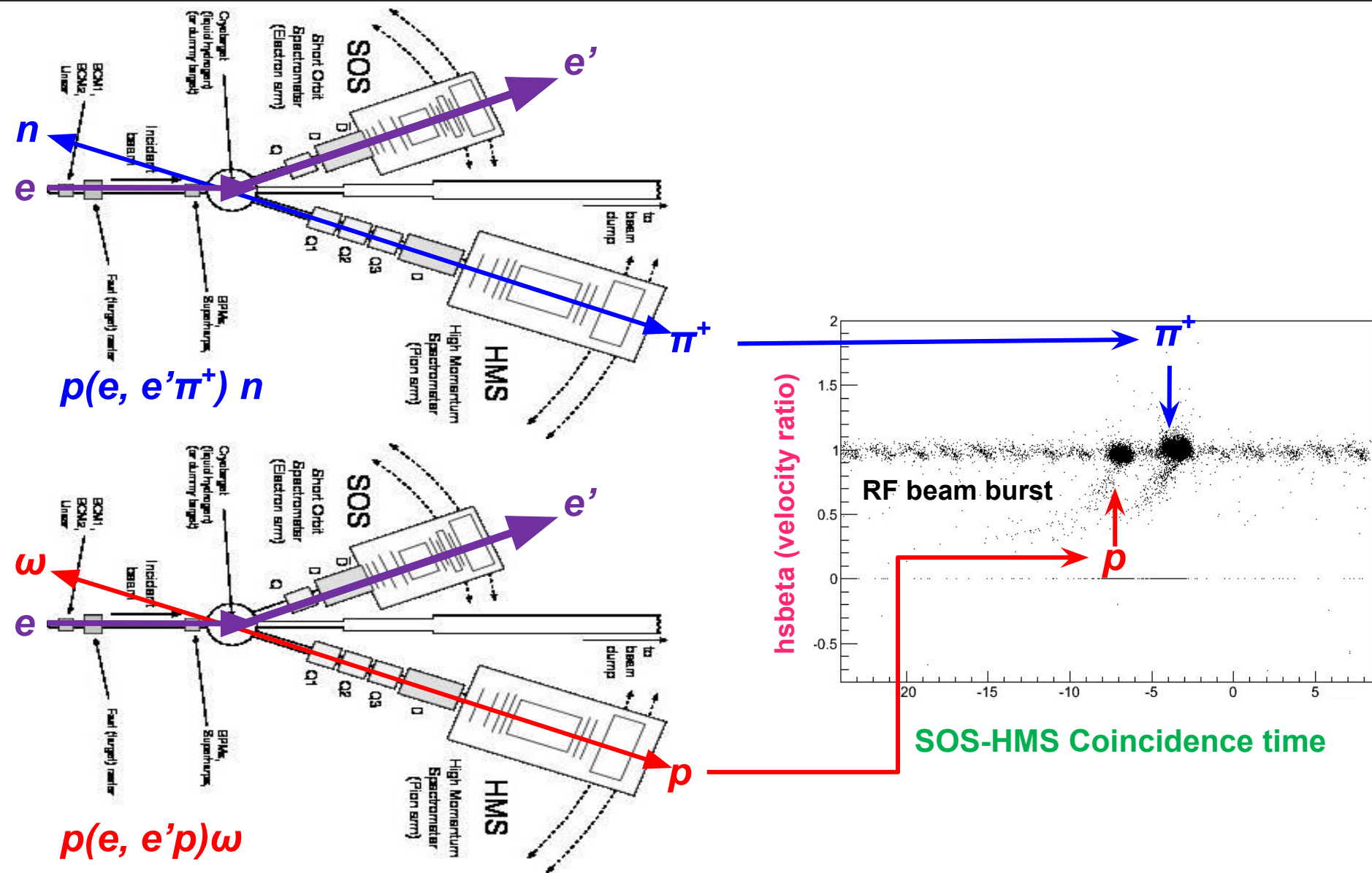# Simutanous Access to DVCS and DVMP at large skeweness

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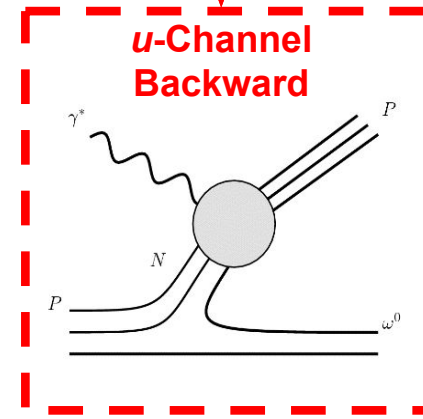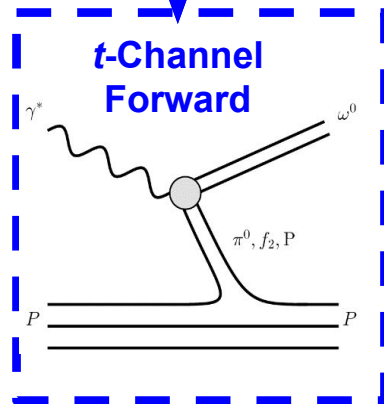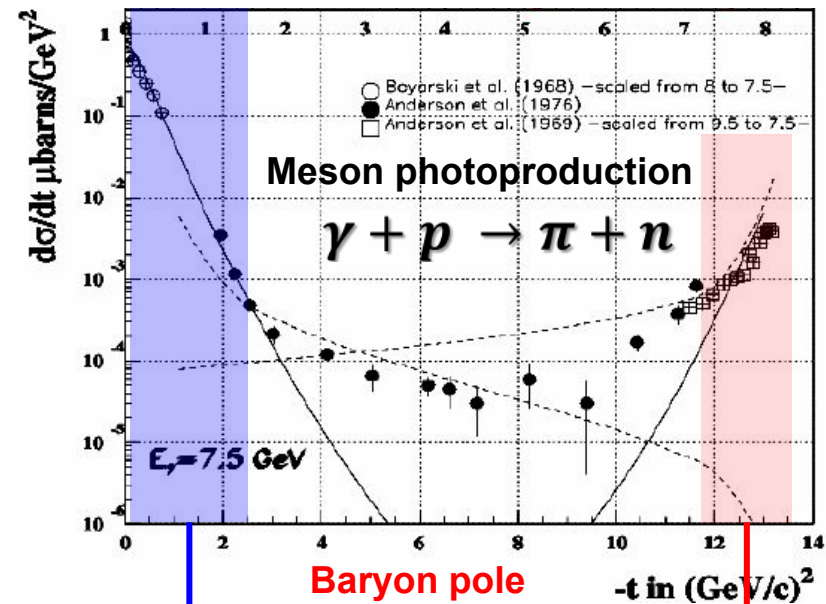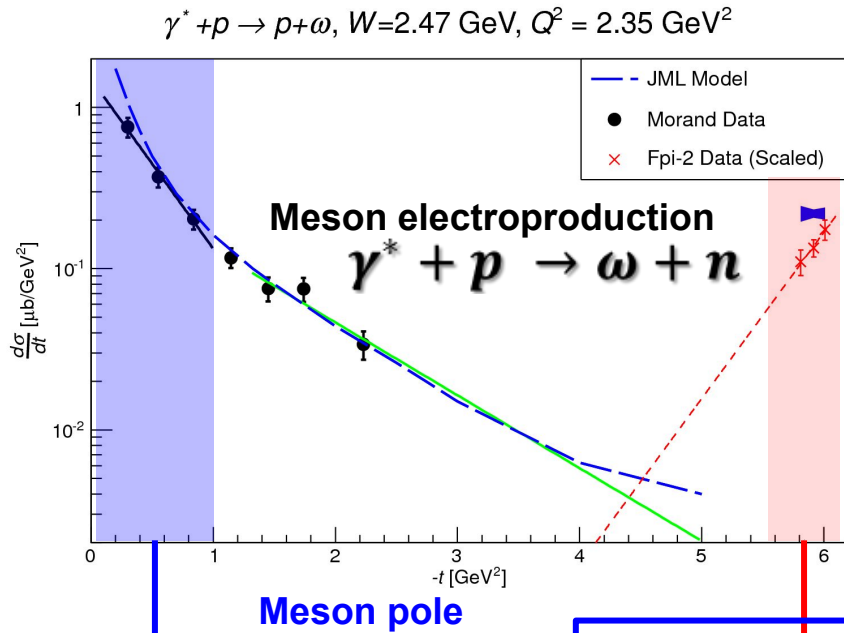
What is Backward Angle Physics

$p(e, e'\pi^+) n$

$p(e, e'p)\omega$

RF beam burst

SOS-HMS Coincidence time

hsbeta (velocity ratio)

Backward Angle physics: Access to a unknown kinematics

$\gamma^* + p \rightarrow p + \omega$, W=2.47 GeV, Q^2 = 2.35 GeV^2

Meson electroproduction

$$\gamma^* + p \rightarrow \omega + n$$

- – – JML Model
- ● Morand Data
- × Fpi-2 Data (Scaled)

Meson photoproduction

$$\gamma + p \rightarrow \pi + n$$

○ Boyarski et al. (1968) −scaled from 8 to 7.5−
● Anderson et al. (1976)
□ Anderson et al. (1969) −scaled from 9.5 to 7.5

$E_\gamma = 7.5$ GeV

Meson pole

Baryon pole

_t_-Channel Forward

_u_-Channel Backward

Soft structure -> Hard -> Soft transition !

# What can we learn from the backward angle observable?

- Why Now?
  - Backward angle cross section is demonstrated to be non-zero!

- Compete picture of *-t* evolution
  - Provide low *-u* cross section

- Regge Model
  - Study the baryon Regge pole (trajectory)

- GPD factorization at larger *-t* in the backward angle
  - Alternate or parallel methodology

- Quantify physics meaning of *u*
  - *t* -> impact parameter
  - *s*-> invariant mass
  - Q^2 -> Resolving power
  - ***u -> ?***
    - **better understanding t leads to understand of *u***

High *-t* **High *-u***

Low *-t* **CLAS 12** Gap?! **Low *-u***

--- JML Model
● Morand Data
✕ Fpi-2 Data (Sc
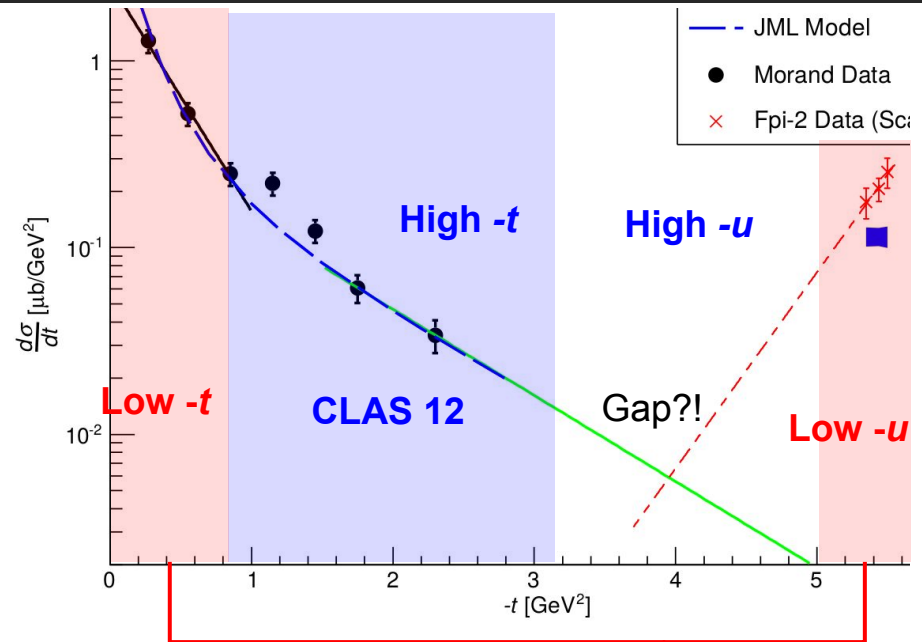
Hall A/C LT separation near meson and baryon pole (extreme forward/backward angle)

Q^2=1 GeV, *W*=1.5 GeV

How Do We access the backward angle physics?
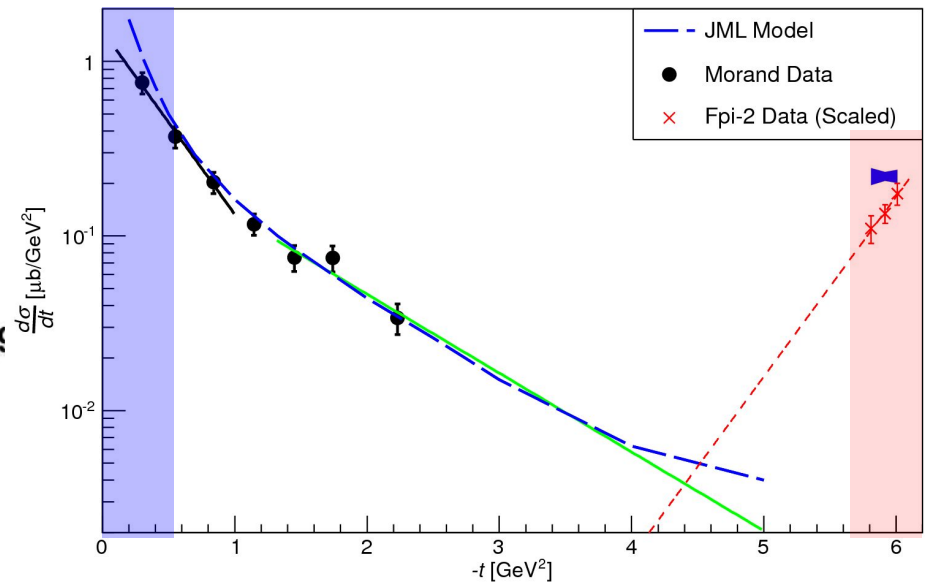

e'

p

HMS

SHMS

p(e, e'p)X

π^0 or γ

e

~200-500 MeV Real Photon

NPS
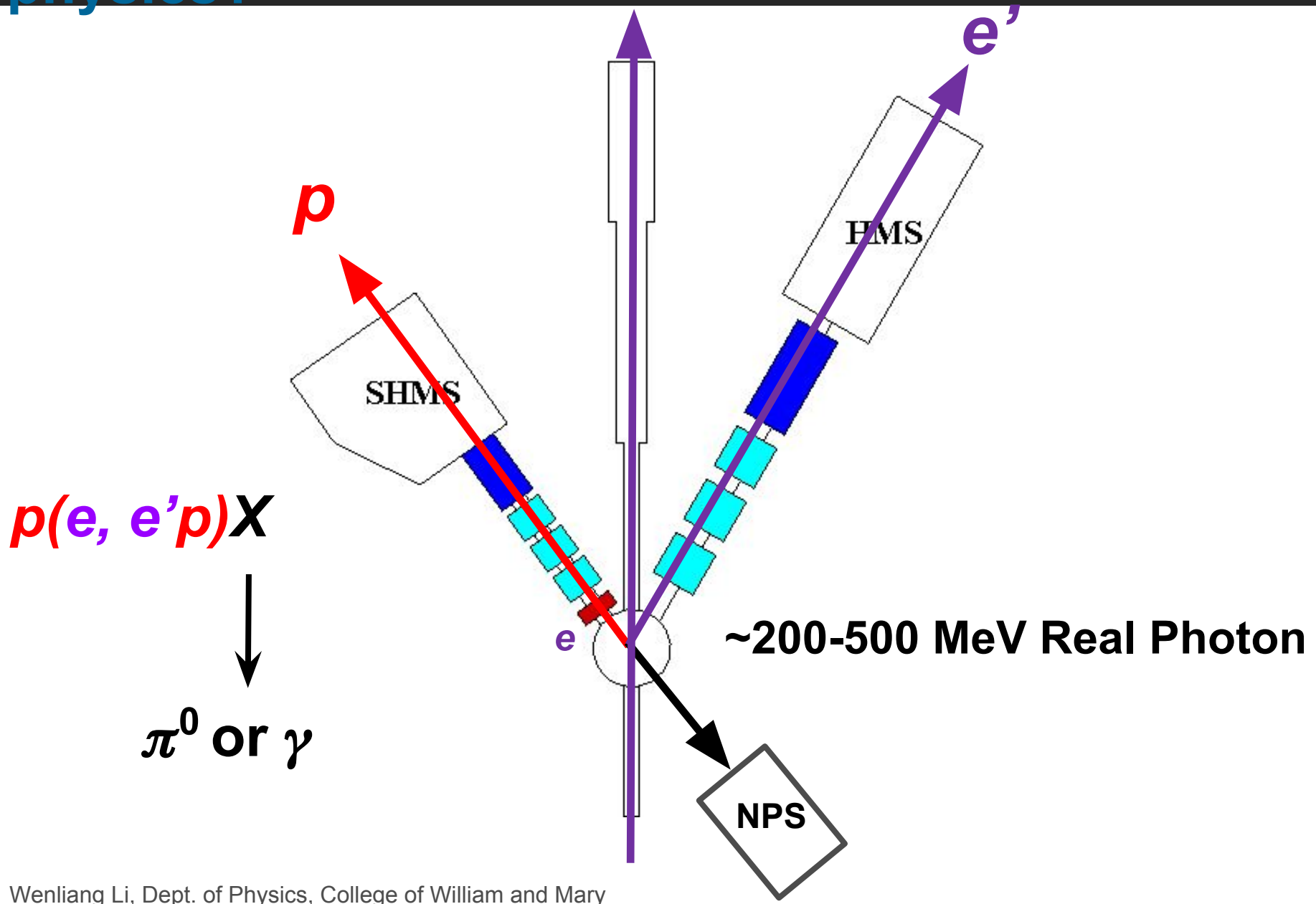
At What Kinematics?

Q^2 vs x_B coverage in Hall C

E_b = 11 GeV
E_b = 8.8 GeV
E_b = 6.6 GeV
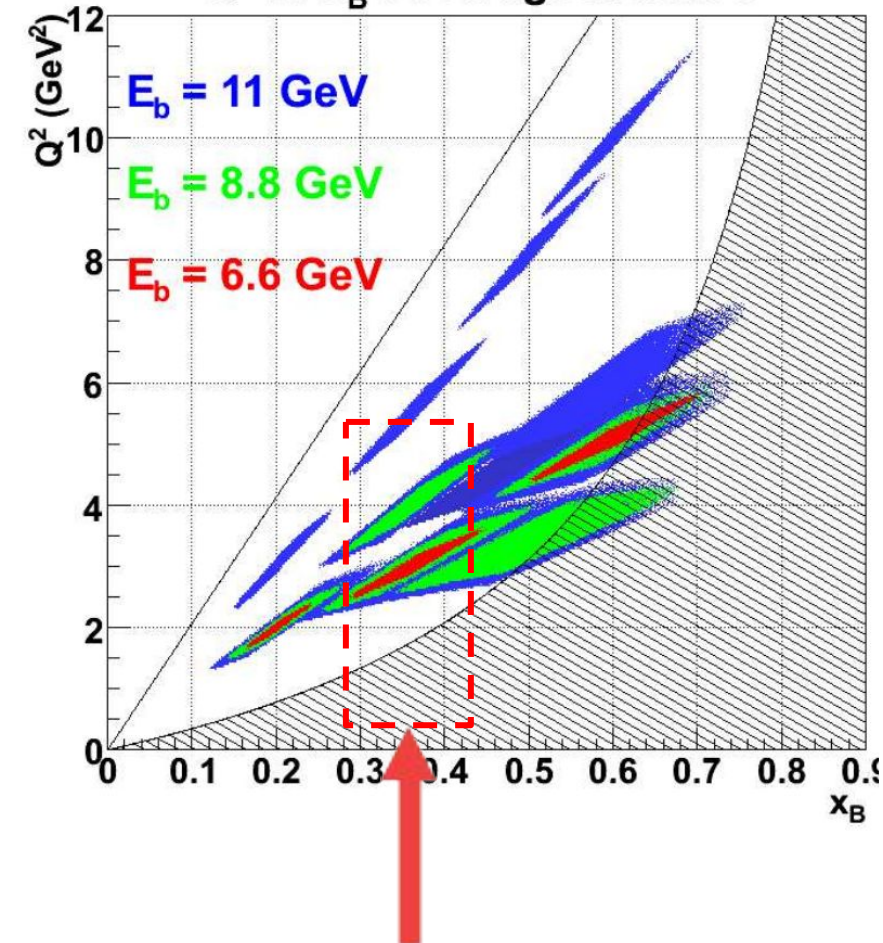
W = 2.65 GeV, x = 0.36

Q2	EBeam (GeV)	HMS Angle (Degree)	SHMS Angle Degree	NPS angle Degree	-t	-u'
3	6.6	26	-11	170	>7.0	0.0
4	6.6	22	-10.4	170	>10.0	0.0

- – – JML Model
- ● Morand Data
- × Fpi-2 Data (Scaled)

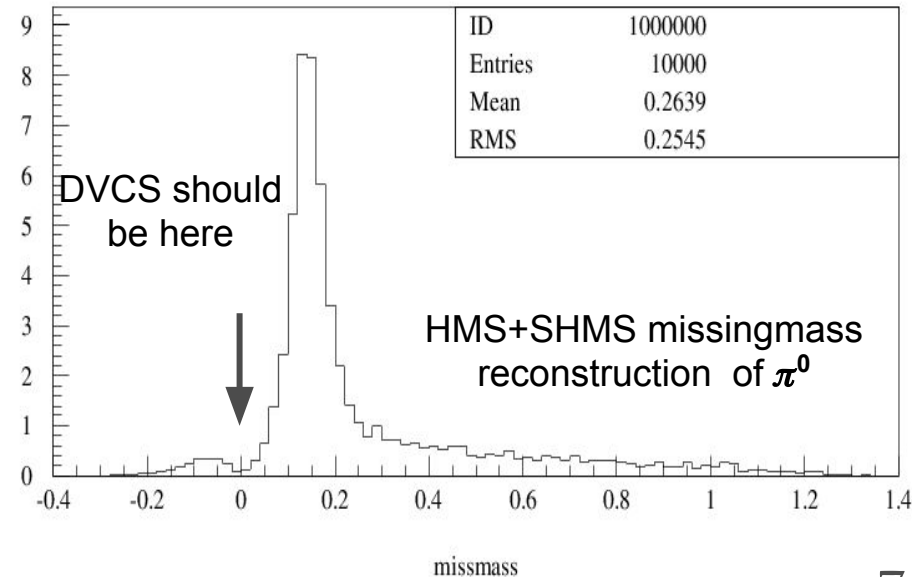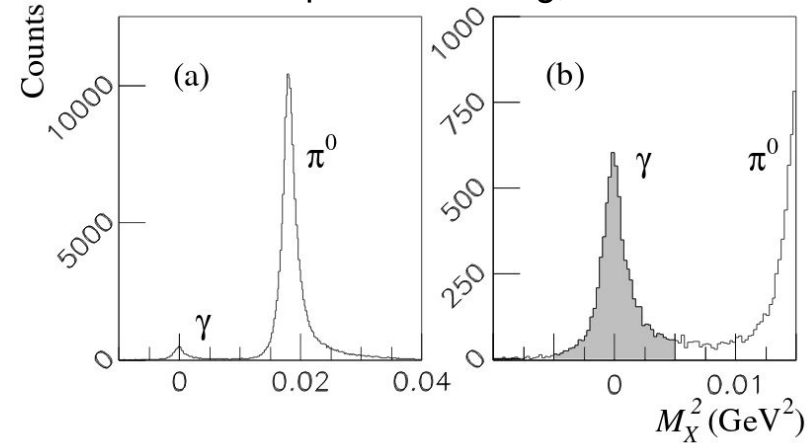**Forward Angle Pi0 and DVCS**   **Forward Angle Pi0 and DVCS**

Requirements for Backward Angle DVCS and π^0 Program

- **Backward angle π^0 Program**
  - *W = 2.65 GeV, x = 0.36, Q^2 = 3, 4 GeV*
  - **Standard L/T Separation**
    - Do nStandarSHMS + HMS
  - Missing mass reconstraction method applies.

- Backward Angle DVCS Program
  - Run simultanously with the π^0 Program
  - LT Separation?
  - Requireds NPS for ~300 MeV real photon (possible?)
  - A three ton stand required.
  - Triple conincidence

- LOI for PAC 2018

Hall A Backward Angle Virtual Compton Scattering, 2009

DVCS should be here

HMS+SHMS missingmass reconstruction of π^0

Thanks You