

# Beam Asymmetry Progress

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KaonLT Experiment, Jefferson Lab Hall C

KaonLT/PionLT meeting June 8



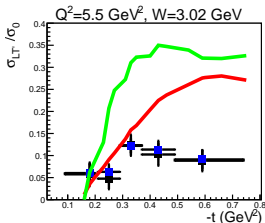
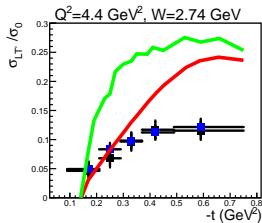
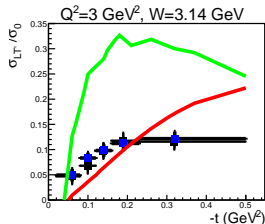
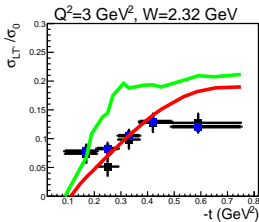
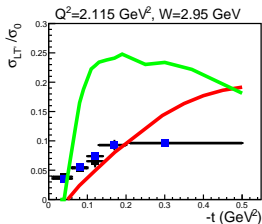
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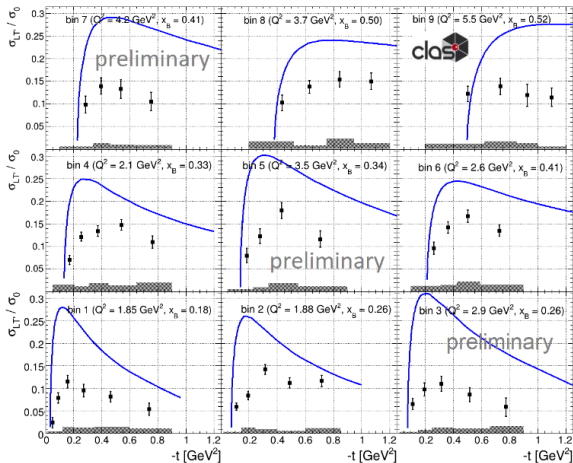
- Errors: beam polarization, missing mass, coin time
- Models: VR, VGL, PARTONS (GK)



- $A_{LU}^{sin\phi} = \sqrt{2\epsilon(\epsilon+1)}\sigma_{LT'}/\sigma_0$  supported as an observable
- Calculated via Goloskokov-Kroll model (same used by S. Diehl et al. in recent BSA paper)
- L/T cross sections calculated by DVMPPProcessGK06 - can write code to make these an observable



- Diehl et al (SciPost Phys. Proc. 8, 066 (2022)) also found GK over-estimates magnitude of  $\sigma_{LT'}/\sigma_0$





- In VR and GK models,  $\sigma_{LT'}/\sigma_0 \approx 10^{-1}$
- VGL model has  $\sigma_{LT'}/\sigma_0 \approx 10^{-16}$
- $\sigma_0 \approx 10^{-1}$  as in VR and GK
- But  $\sigma_{LT'} \approx 10^{-17}$



## 3 Main Systematics:

- Beam polarization - asking Steve Wood for uncertainty on his beam pol calculation
- Missing mass - cut dependence
- Coin time - cut dependence



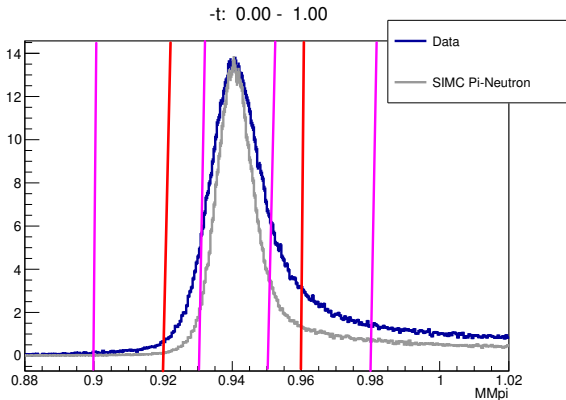
0.92 – 0.96 GeV

Narrow:

0.93 – 0.95 GeV

Wide:

0.90 – 0.98 GeV







Bin	1	2	3	4	5
Mean -t	0.17	0.25	0.33	0.42	0.59
A	$3.3 \pm 0.7$	$3.3 \pm 0.7$	$4.4 \pm 0.7$	$5.7 \pm 0.7$	$5.7 \pm 0.7$
A (MM wide)	$3.1 \pm 0.9$	$1.4 \pm 0.7$	$4 \pm 1$	$6 \pm 1$	$5.4 \pm 0.9$
A (MM narrow)	$3.5 \pm 1.2$	$1.8 \pm 0.8$	$4.2 \pm 0.9$	$5.4 \pm 1.1$	$6 \pm 1$

- How to quantify the error from these values?
- Assuming this should be done separately for  $A$  from full and approximated fits

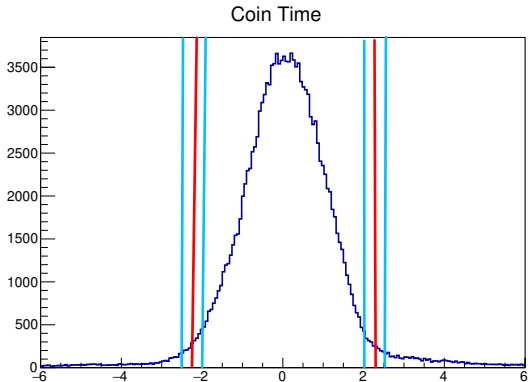
$$\delta(A)_{MM} = \text{avg}(|A - A'|, |A - A''|)$$



$\pm 2.25$

Narrow:  $\pm 2.00$

Wide:  $\pm 2.50$



- Do I also adjust the width of the random windows?
- Or just change the normalization factor?