KaonLT Meeting

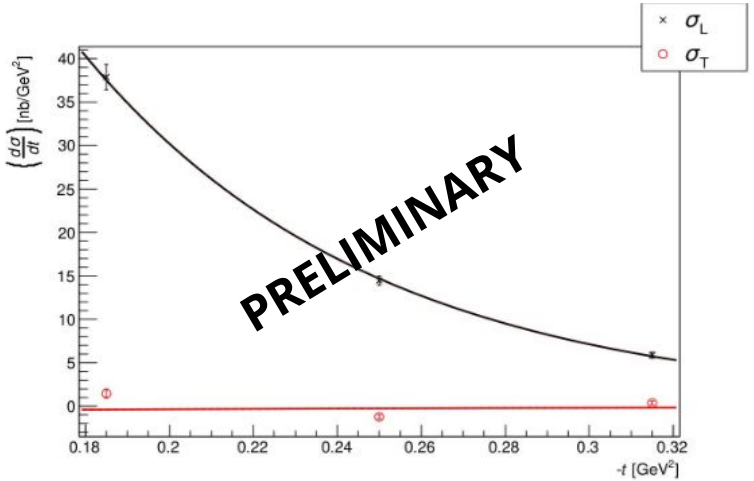
March 19th-20th, 2024

Richard Trotta

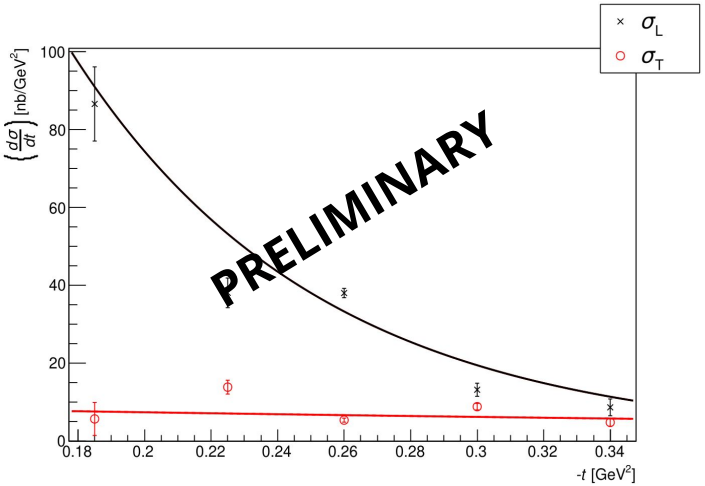
Trends Across Q^2

- Agreement of σ_L with exponential fit
  - A key sign of the kaon pole
- Performing form factor extractions may be possible up to ~4-5 GeV^2

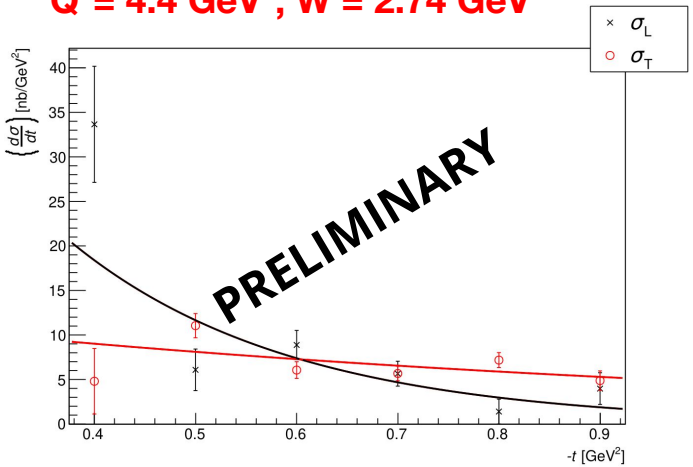
Q^2= 2.115 GeV^2, W = 2.95 GeV



Q^2= 3.0 GeV^2, W = 3.14 GeV



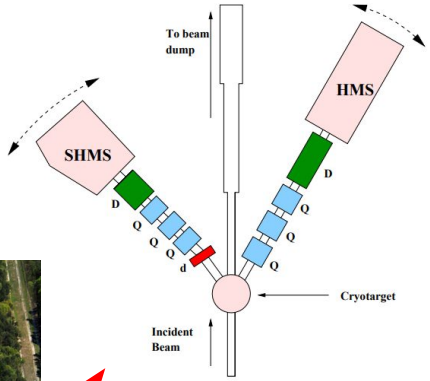
Q^2= 4.4 GeV^2, W = 2.74 GeV

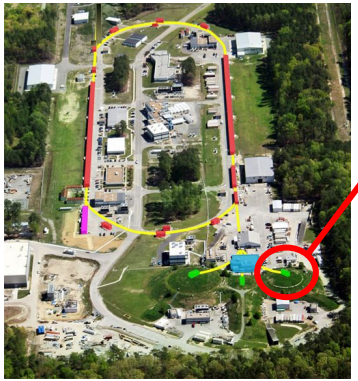


KaonLT - Data Collected

~70% of proposal data taken

- The p(e, e′K$^+$)Λ,Σ^0 experiment ran in Hall C at Jefferson Lab over the fall 2018 and spring 201ϙ





E (GeV)	Q^2 (GeV^2)	W (GeV)	x	$\varepsilon_{high}/\varepsilon_{low}$	Δε	Study Type
10.6/8.2	5.5	3.02	0.40	0.53/0.18	0.35	scaling
10.6/8.2	4.4	2.74	0.40	0.72/0.48	0.24	scaling
10.6/6.2	3.0	2.32	0.40	0.88/0.57	0.31	both
10.6/8.2	3.0	3.14	0.25	0.67/0.39	0.28	scaling
10.6/6.2	2.115	2.95	0.21	0.79/0.25	0.54	both
4.9/3.8	0.5	2.40	0.09	0.70/0.45	0.25	FF

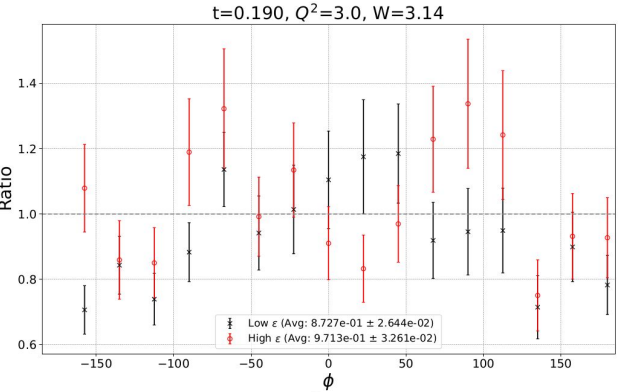
Analysis by Abdennacer Hamdi

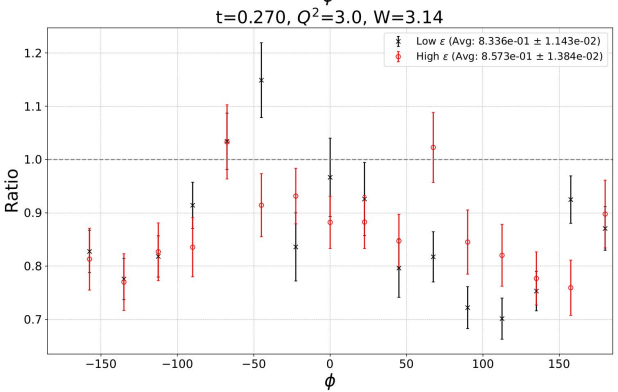
Settings Breakdown

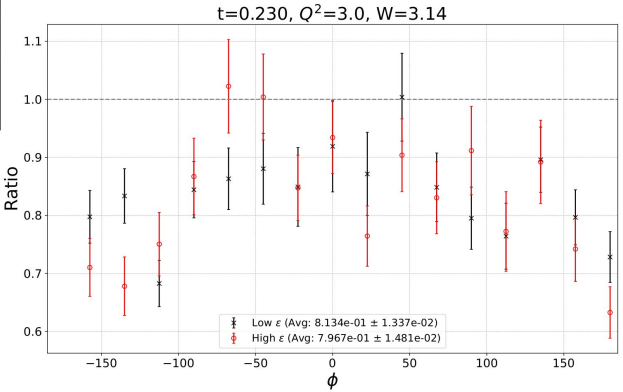
- Q^2=2.115, W=2.95
  - TBD (Previously good agreement with Q^2=3.0, W=3.14 setting)
  - Low statistics (~2 good bins)
- Q^2=3.0, W=2.32
  - TBD
- Q^2=3.0, W=3.14
  - **R~1**
- Q^2=4.4, W=2.74
  - Approaching R~1
- Q^2=5.5, W=3.02
  - Approaching R~1 for good bins
  - Low statistics (~1 good bin)

$$w_{\text{factor}} = \frac{1}{(W^2 - M^2)^{0.85 \cdot W_c^2 - 5.97 \cdot W_c + 12.68}}$$

Q^2=3.0, W=3.14, t=(0.17-0.40), 6t, 16φ







$$\sigma_L = (p_1 \cdot Q_{dep,L} \cdot f_t) \cdot e^{-p_2|t|}$$

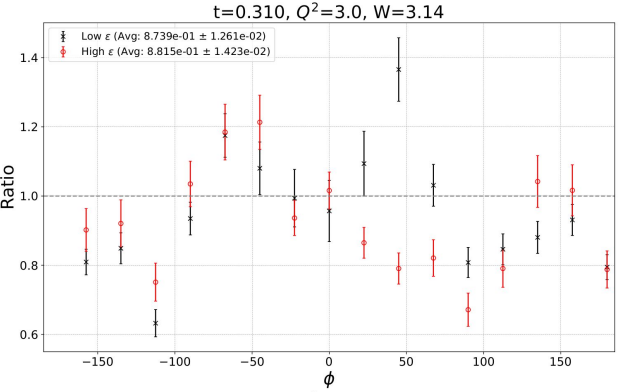
$$\sigma_T = (p_5 e^{-p_6|t|} + p_7 \cdot |t|) \cdot Q_{dep,T}^{p_8}$$

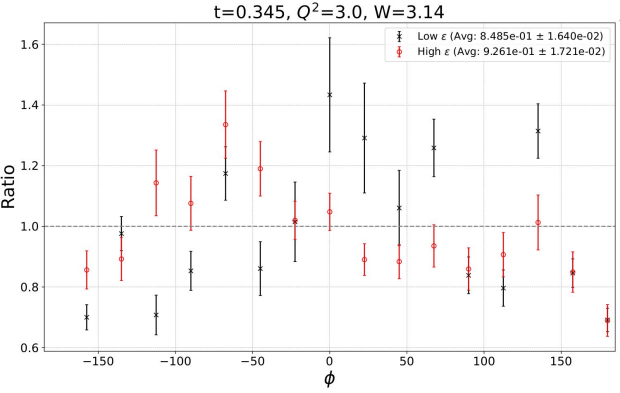
$$\sigma_{LT} = (p_9 \cdot e^{p_{10}|t|} + \frac{p_{11}}{|t|}) \cdot \sin\theta$$

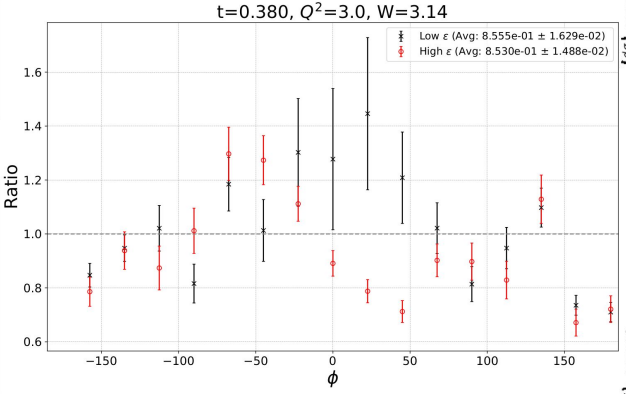
$$\sigma_{TT} = (p_{13} \cdot Q^2 \cdot e^{-Q^2}) \cdot f_t \cdot \sin^2\theta$$

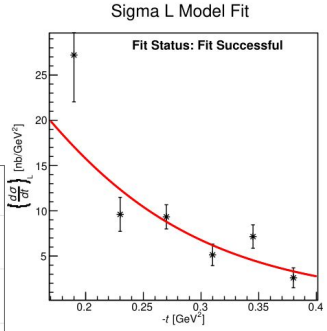
i=5

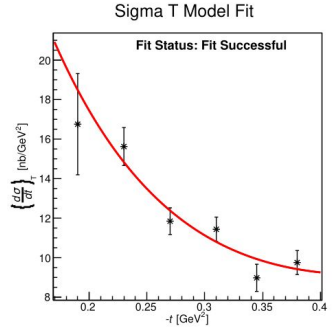
Q^2=3.0, W=3.14, t=(0.17-0.40), 6t, 16φ

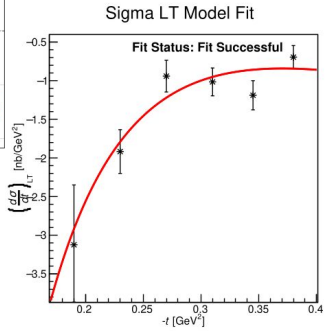


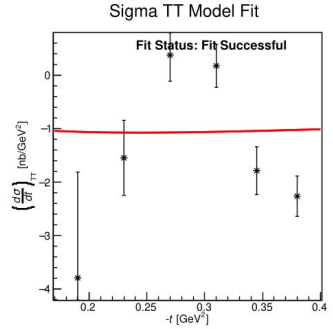












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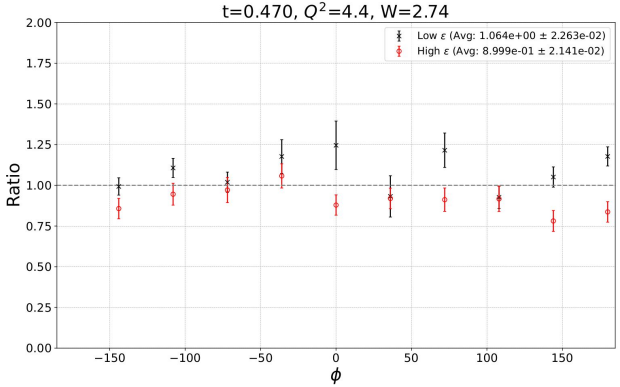
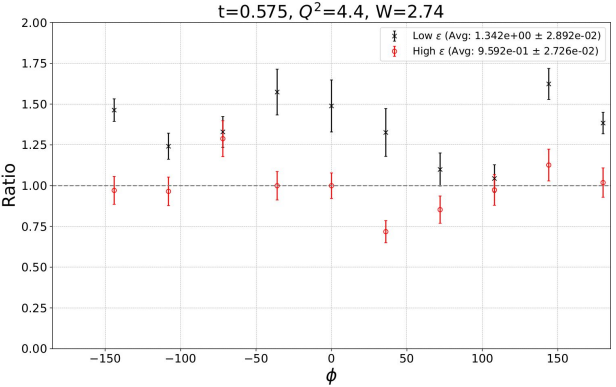
Q^2=4.4, W=2.74, t=(0.40-0.85), 5t, 10φ





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$$\sigma_T = \frac{p_5}{|t|^{p_6}}$$

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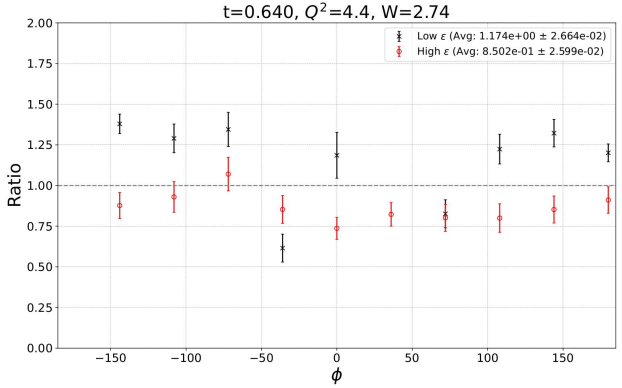

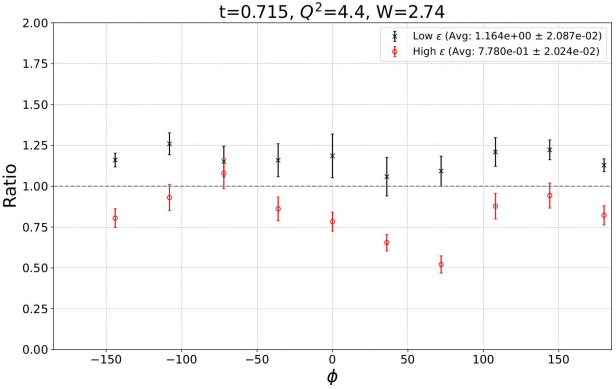

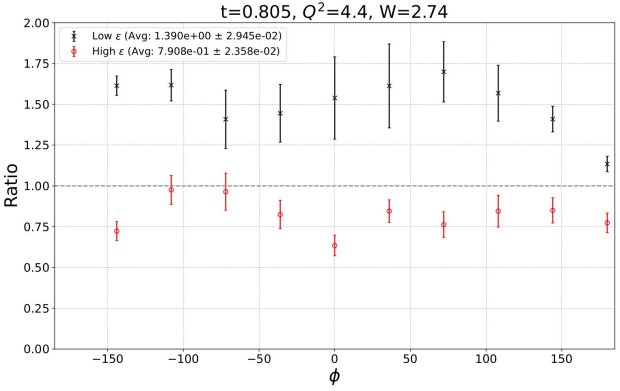

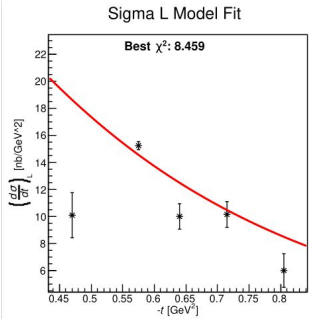

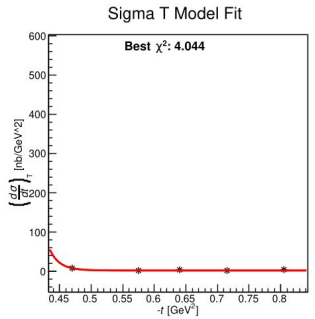

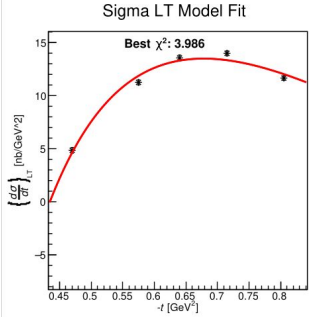

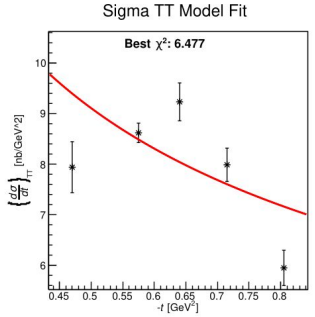

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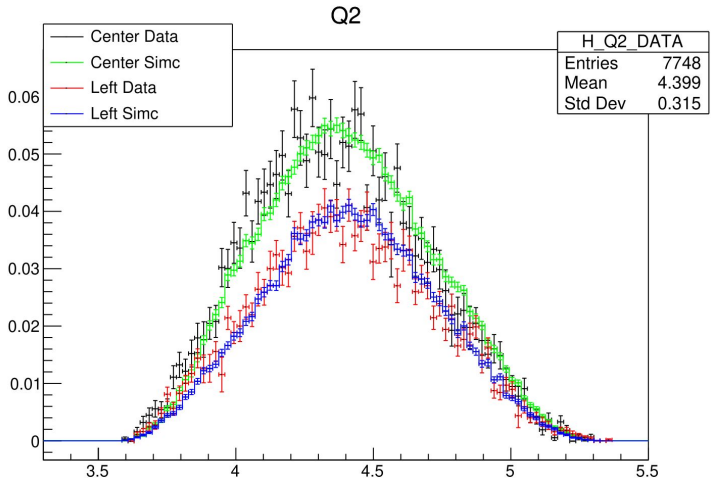

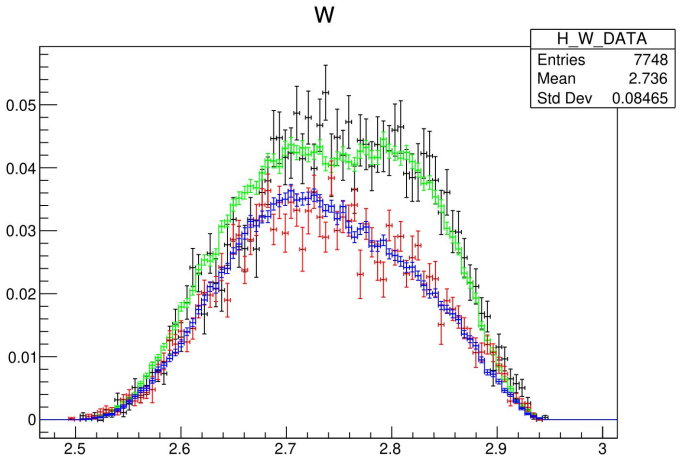

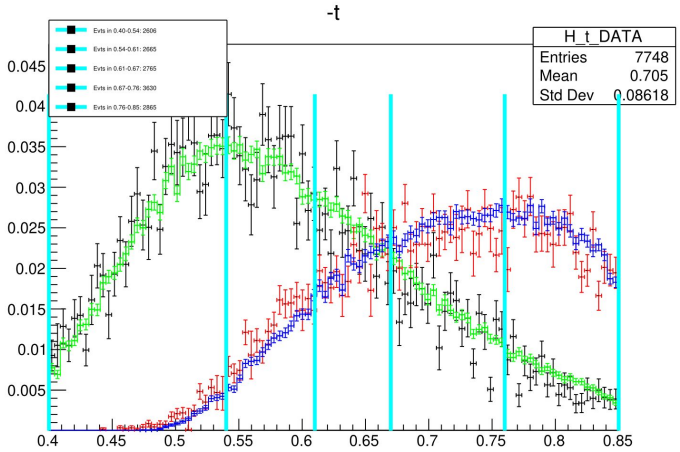

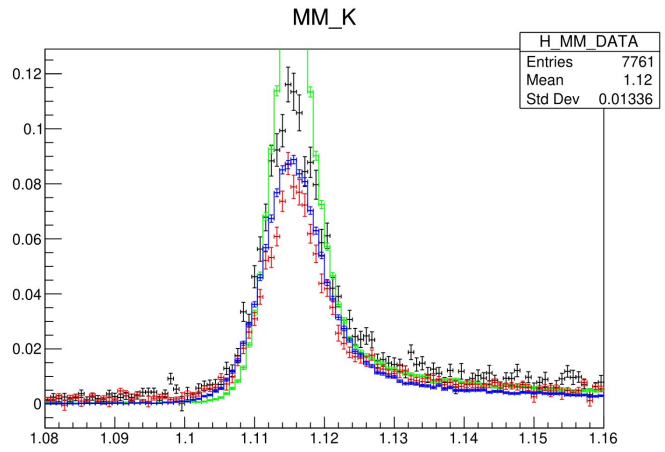

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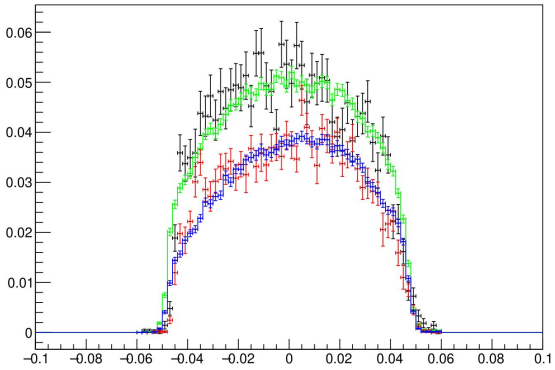
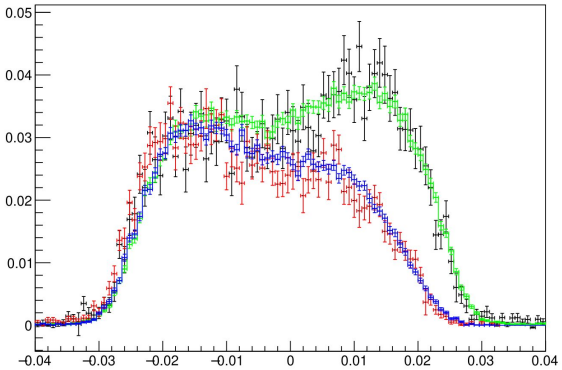
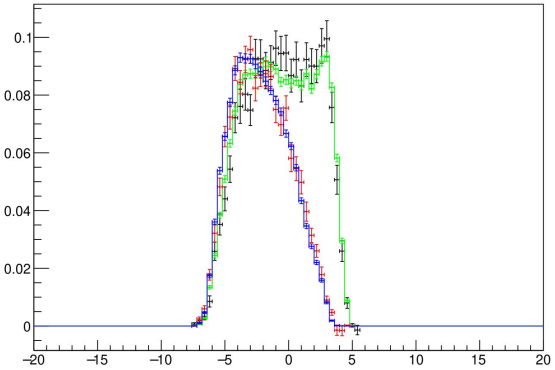
SHMS xptar



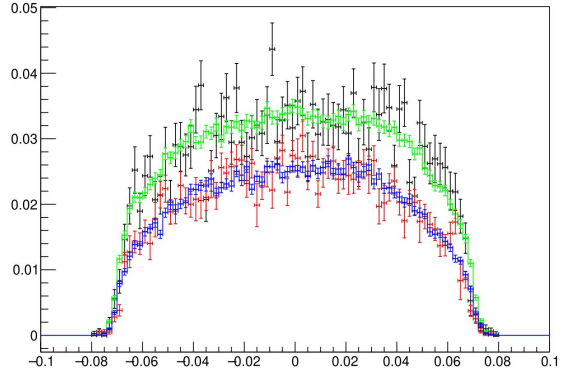
SHMS yptar



SHMS delta



HMS xptar



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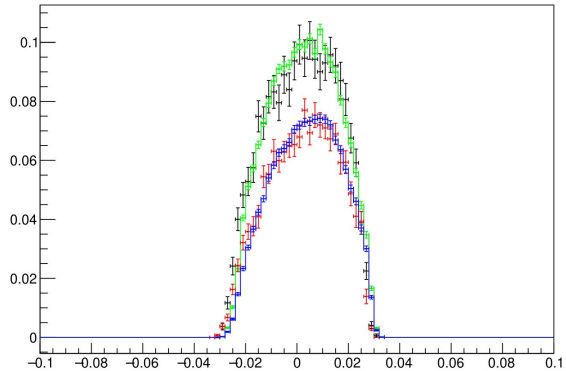

HMS Delta