

KaonLT Meeting

December 11-12th, 2025

Richard L. Trotta

Constants:

$$\pi, \quad m_{\text{tar}} = 0.93827231, \quad m_{\pi^+} = 0.139570, \quad m_{K^+} = 0.493677$$

$$t_{\text{av}} = (0.05032 + 0.01345 \ln Q_{\text{set}}^2) Q_{\text{set}}^2,$$

$$f_{t_{\text{av}}} = \frac{|t| - t_{\text{av}}}{t_{\text{av}}},$$

$$f_t = \frac{|t|}{(|t| + m_{K^+}^2)^2},$$

$$\sigma_L = (p_1 f_t) \exp(-|p_2 t|),$$

$$\sigma_T = p_5 \exp(-|p_6 t|),$$

$$\sigma_{LT} = p_9 \exp(-|p_{10} t|) \sin^2 \theta,$$

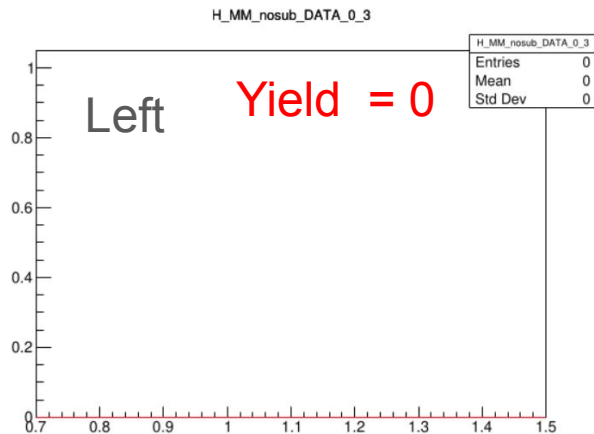
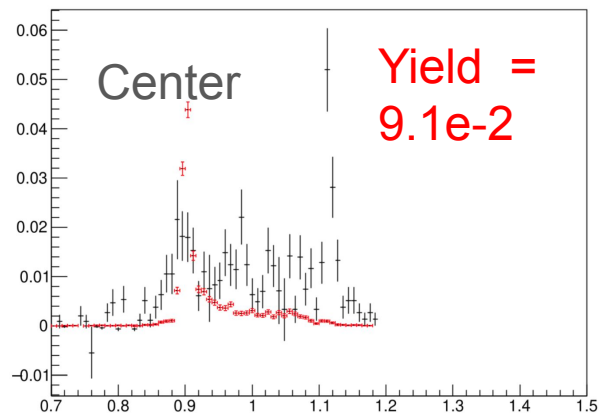
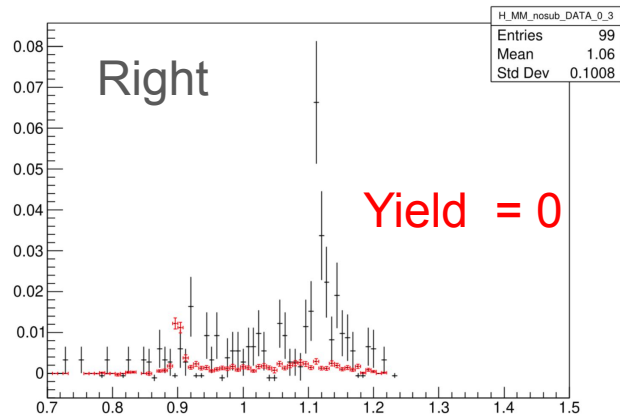
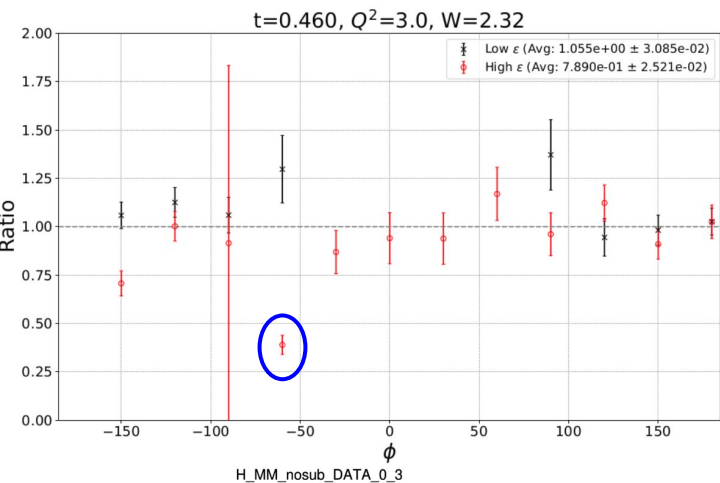
$$\sigma_{TT} = p_{13} \exp(-|p_{14} t|) \sin^2 \theta,$$

$$w_{\text{factor}} = \frac{1}{(W_{\text{set}}^2 - M_{\text{tar}}^2)^{(0.85 W_{\text{set}}^2 - 5.97 W_{\text{set}} + 12.68)}},$$

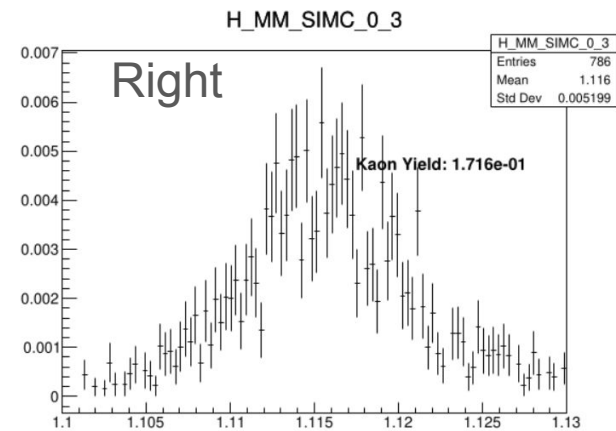
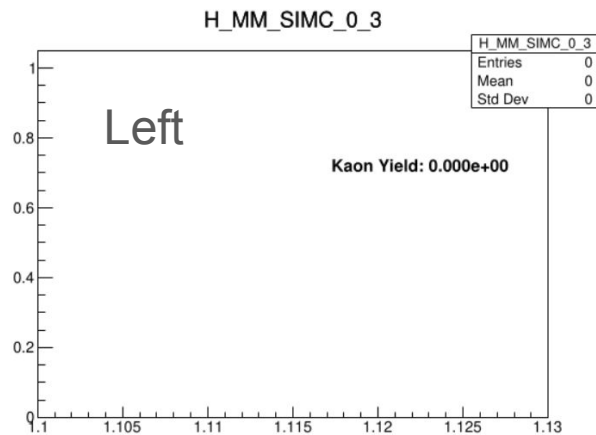
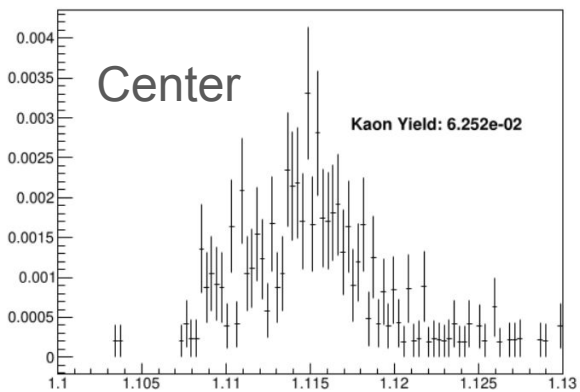
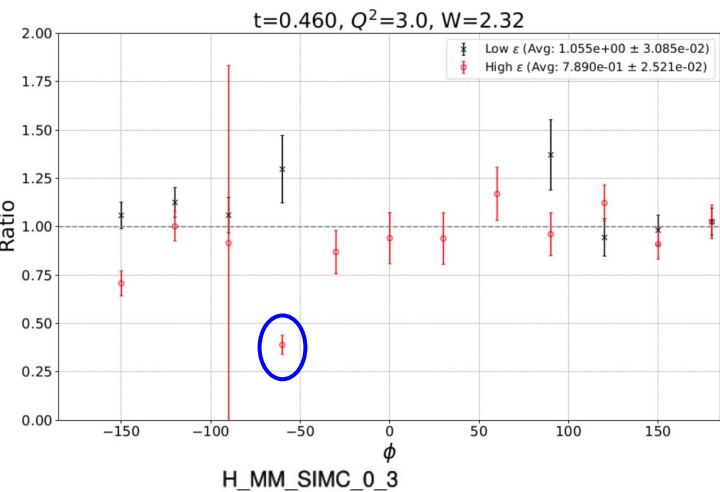
Data has pion subtraction and empirical fit

- No Σ fit

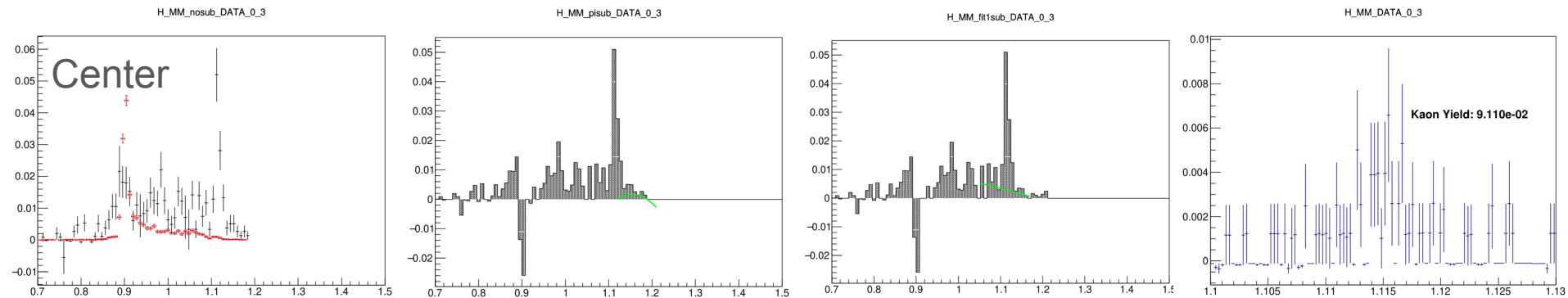
$Q^2=3.0$, $W=2.32$ | High Epsilon



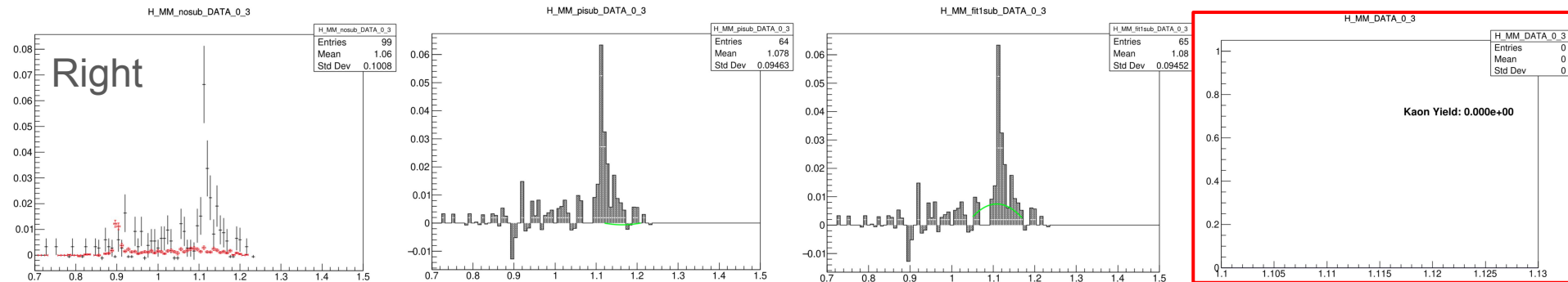
$Q^2=3.0$, $W=2.32$ | High Epsilon



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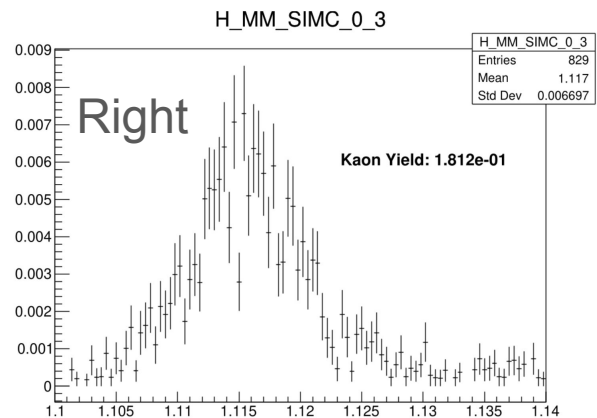
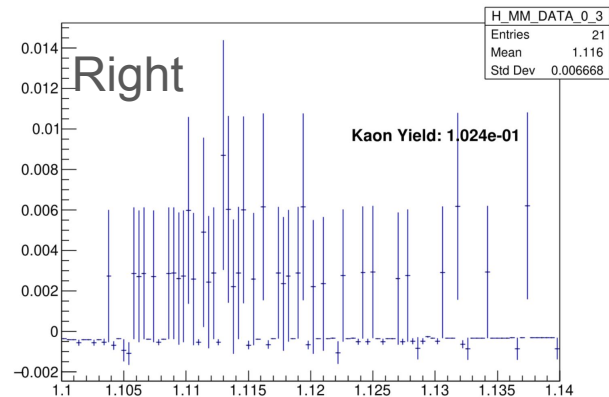
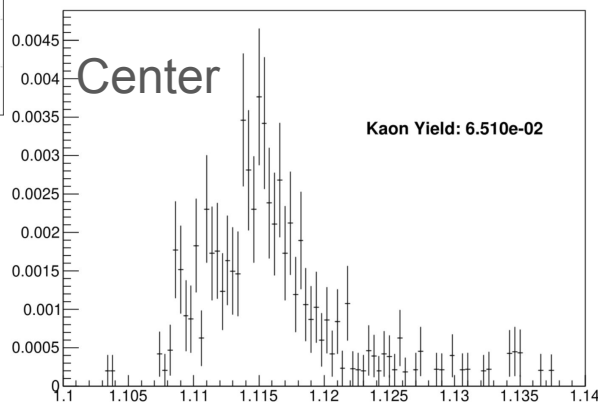
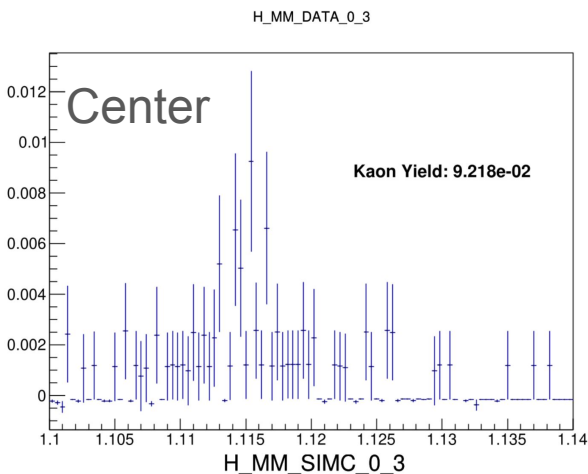
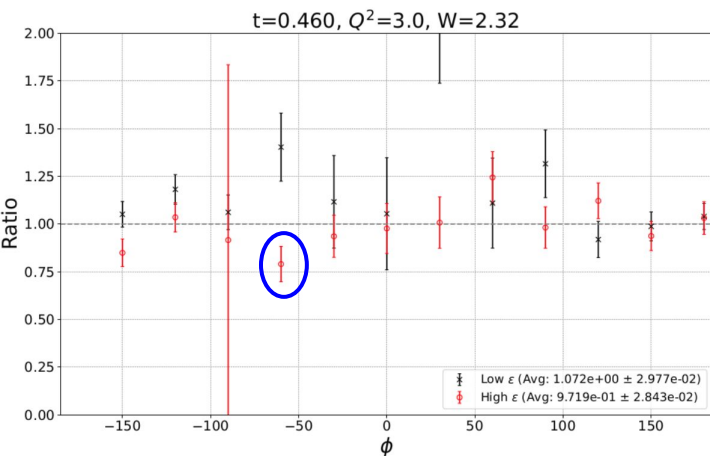
Threshold = 25 events



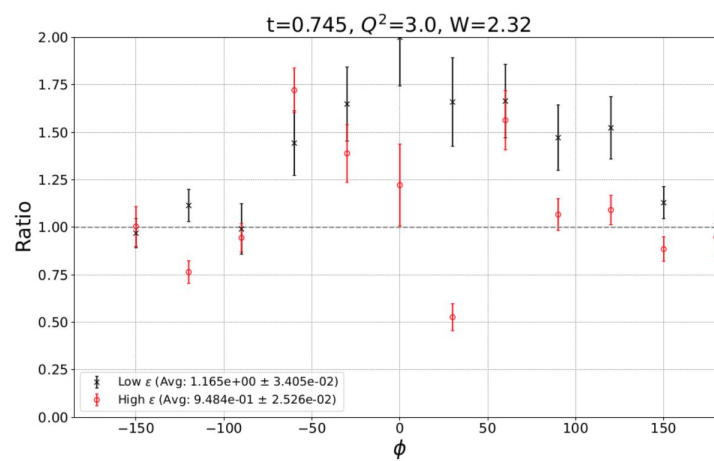
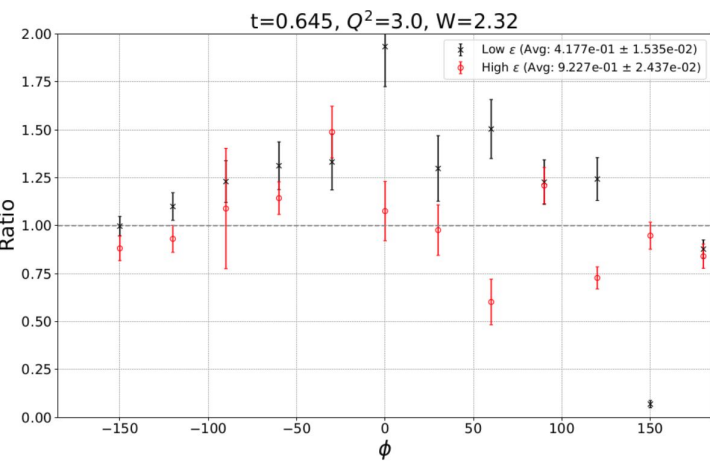
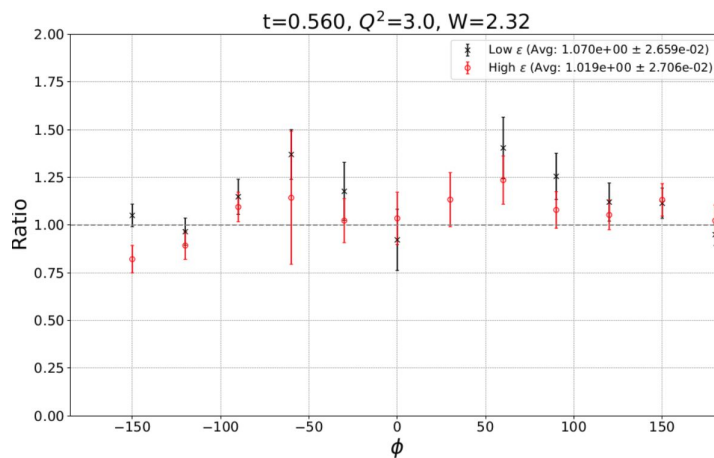
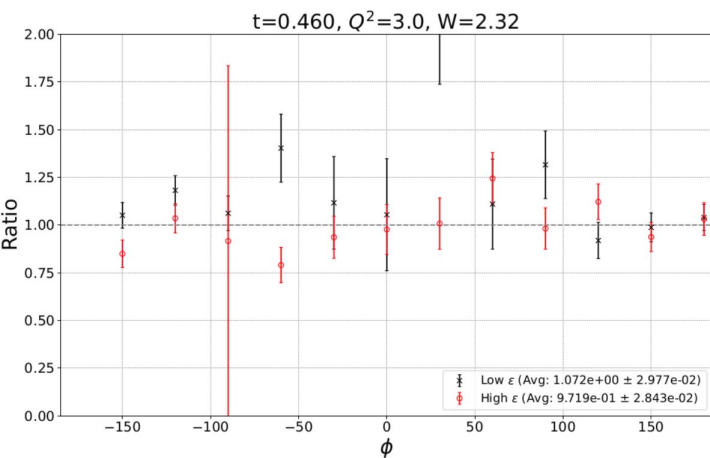
H_MM_DATA_0_3

$Q^2=3.0$, $W=2.32$ | High Epsilon

Threshold = 1 event



$Q^2=3.0$, $W=2.32$ | High Epsilon



Next Steps for Analysis

- Richard...
 - $Q^2=3.0/W=2.32$
 - $Q^2=4.4/W=2.74$
 - $Q^2=5.5/W=3.02$ [Low stats, parameterization based off other settings]
- Kin...
 - $Q^2=2.115/W=2.95$
 - $Q^2=3.0/W=3.14$
- Refine model, last fit optimizations **(Before Holiday Break)**
- Final full replay **(Over Holiday Break)**
 - Kin cross section checks/systematics on $Q^2=3.0, 4.4, 5.5$
 - Richard will focus will be on finishing fit algorithm studies+paper (Fpi1/2,Pion/KaonLT low Q^2)
 - Richard can cross-check Kin's systematics

EXTRA