



University
of Regina

Final Cross Sections - including all factors -

Abdennacer Hamdi

KaonLT Meeting
2026/05/22

$$p(e, e'K^+)\Lambda$$

$$\frac{d\sigma_L}{dt} = \frac{p_0 |t|}{(|t| + m_k^2)^2} e^{-p_1 |t|}$$

$$\frac{d\sigma_T}{dt} = p_2 e^{-|p_3 t|}$$

$$\frac{d\sigma_{LT}}{dt} = p_4 e^{-p_5 |t|} \sin(\theta)$$

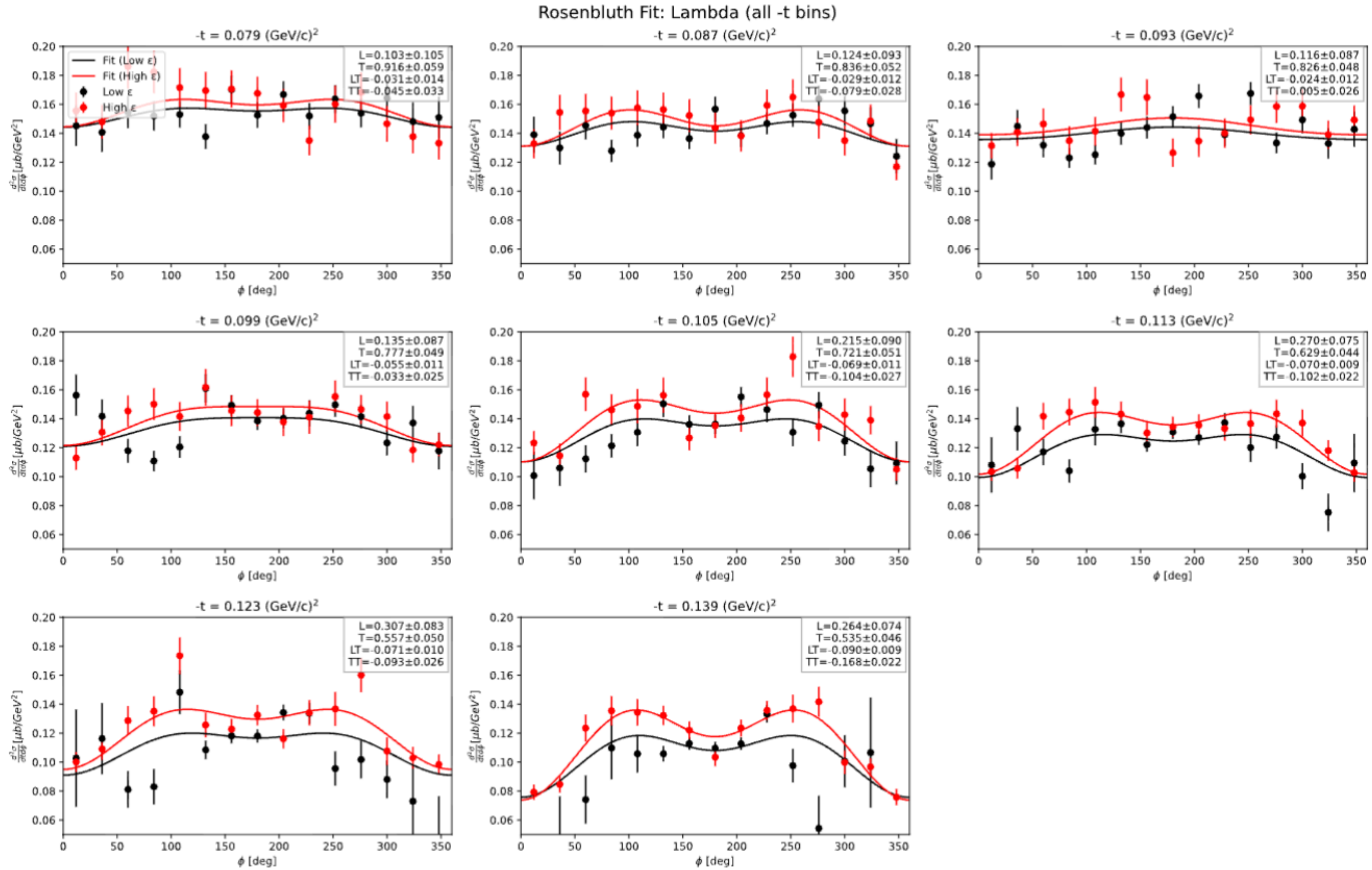
$$\frac{d\sigma_{TT}}{dt} = p_6 e^{-p_7 |t|} \sin^2(\theta)$$

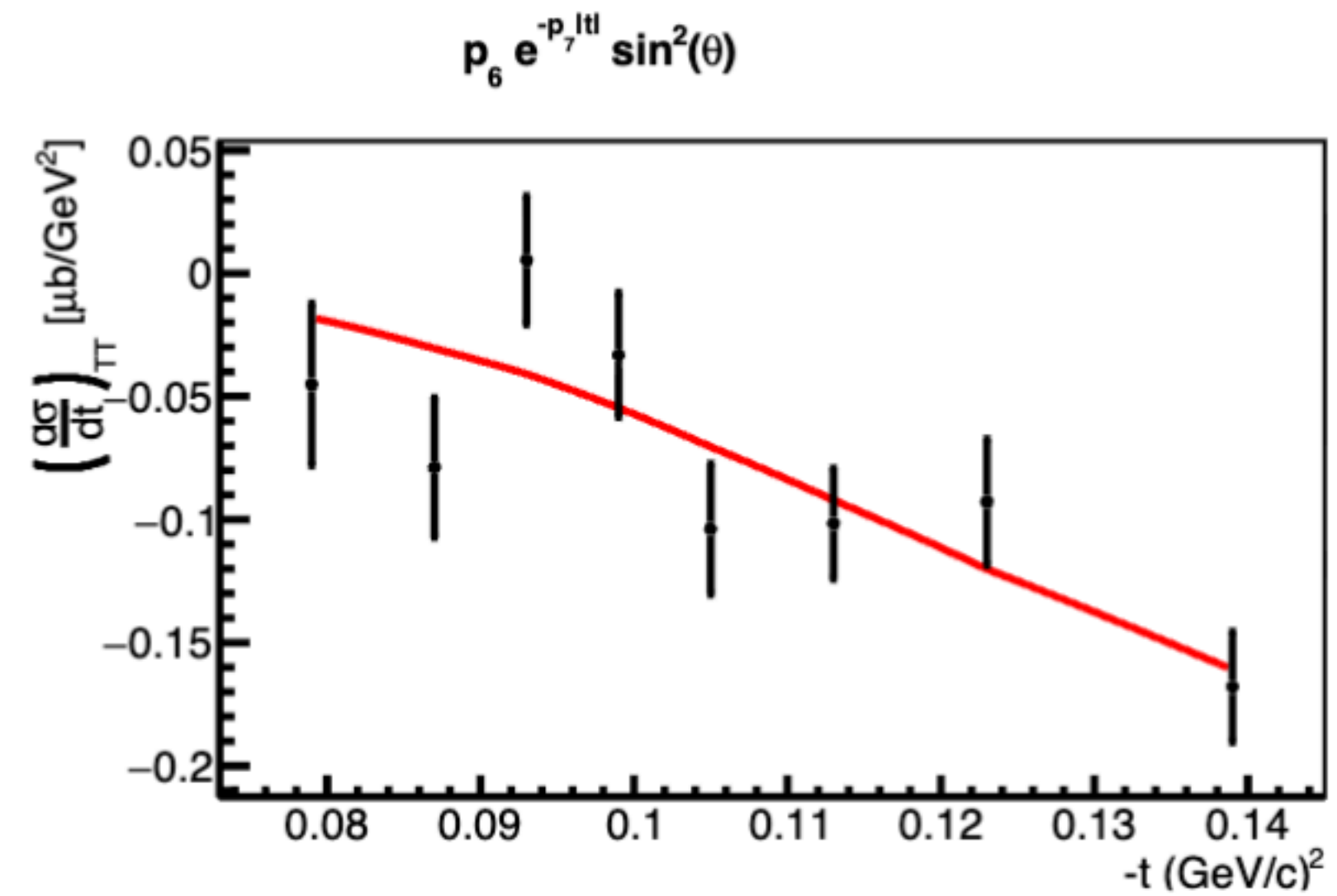
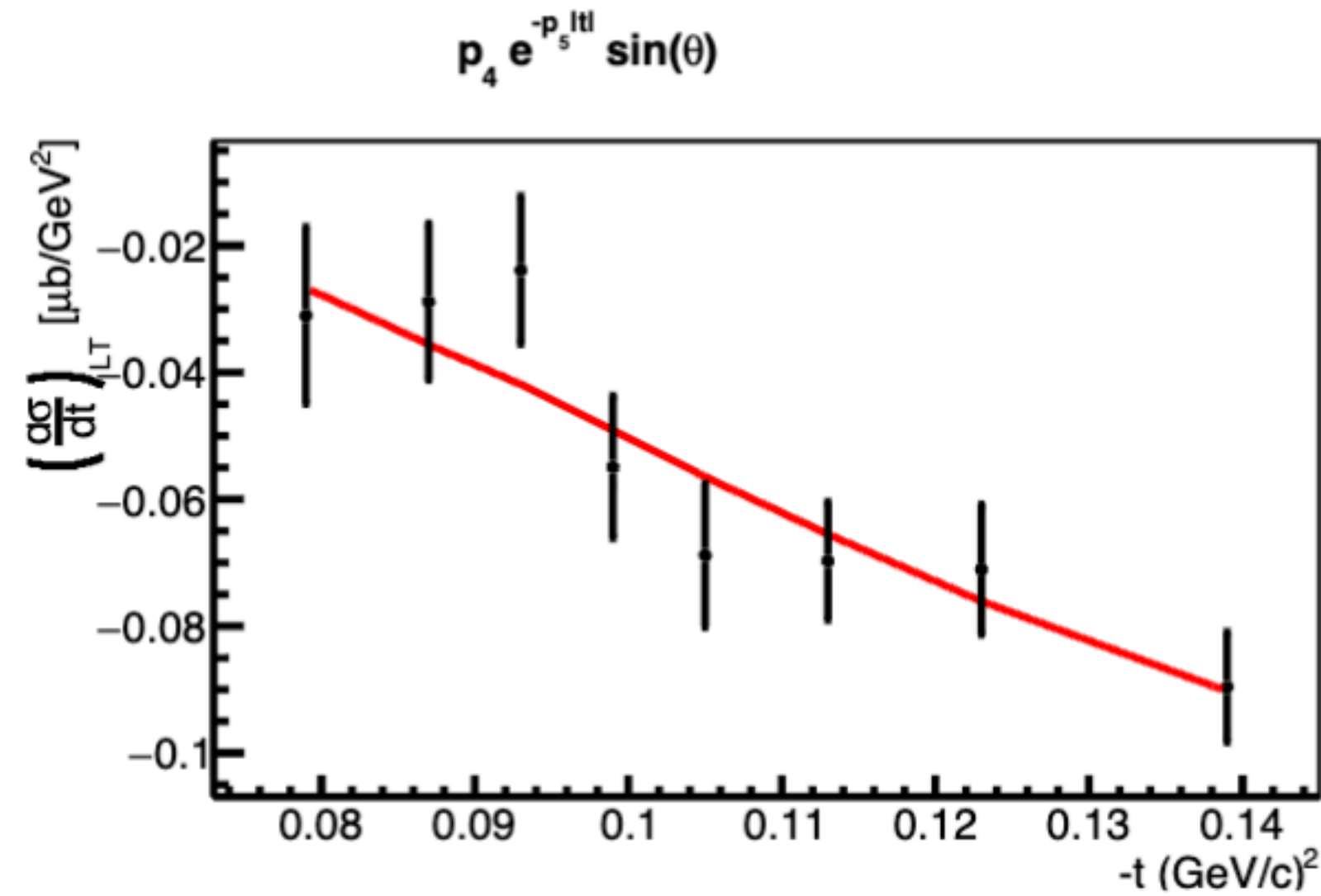
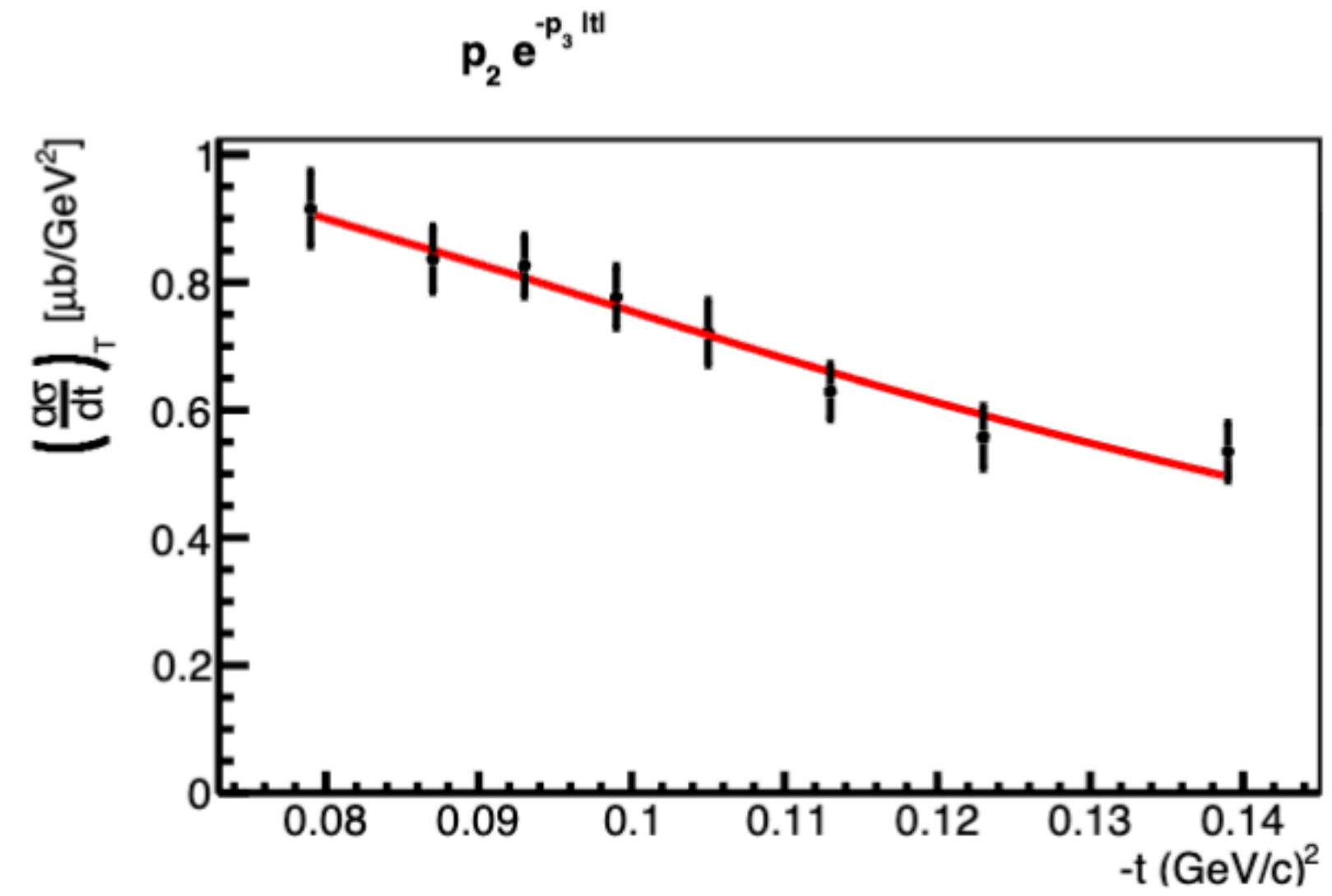
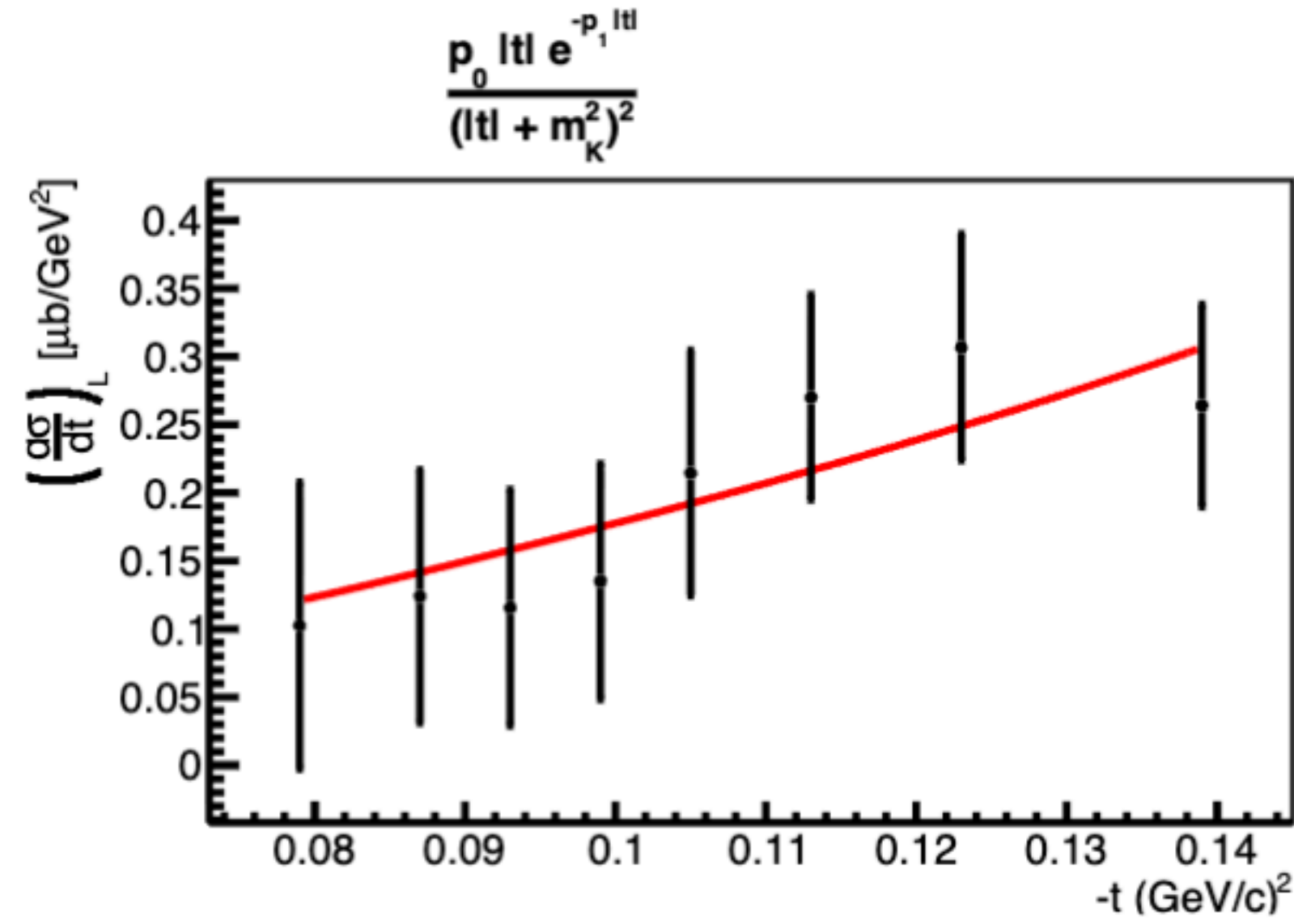
$$W_{factor} = \frac{1}{(W^2 - m_p^2)^2}$$

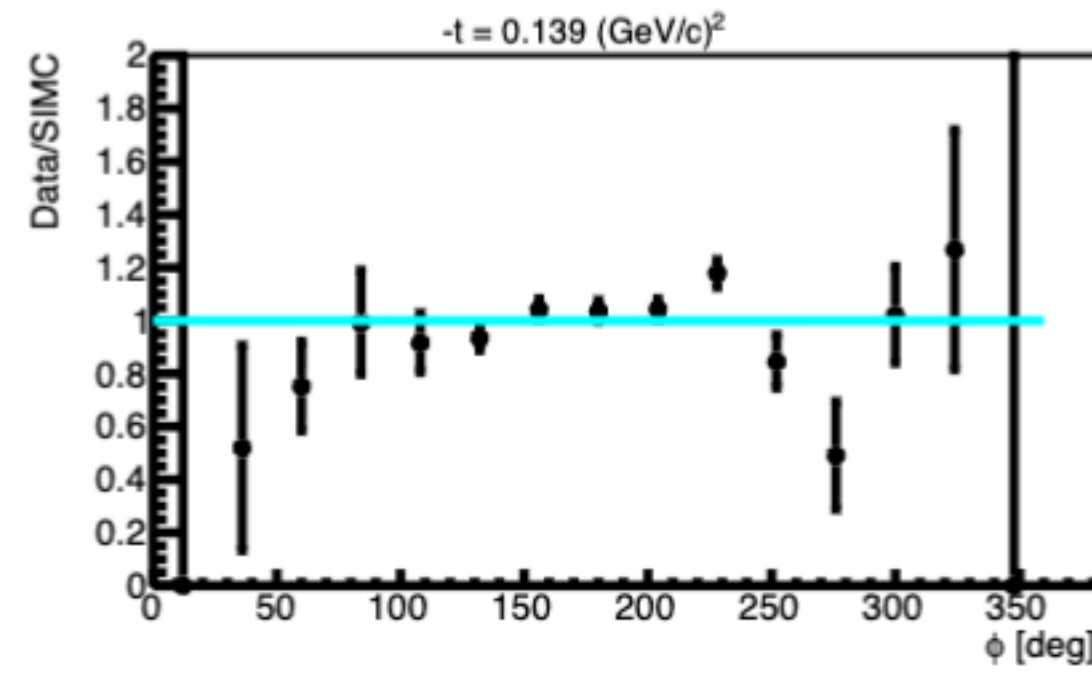
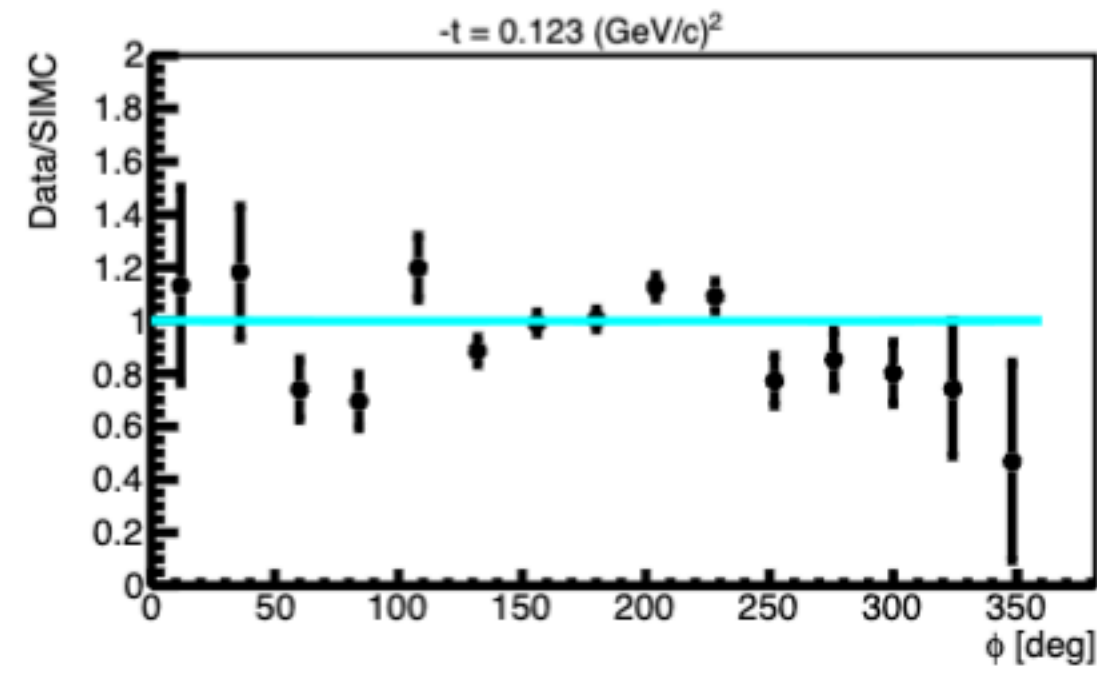
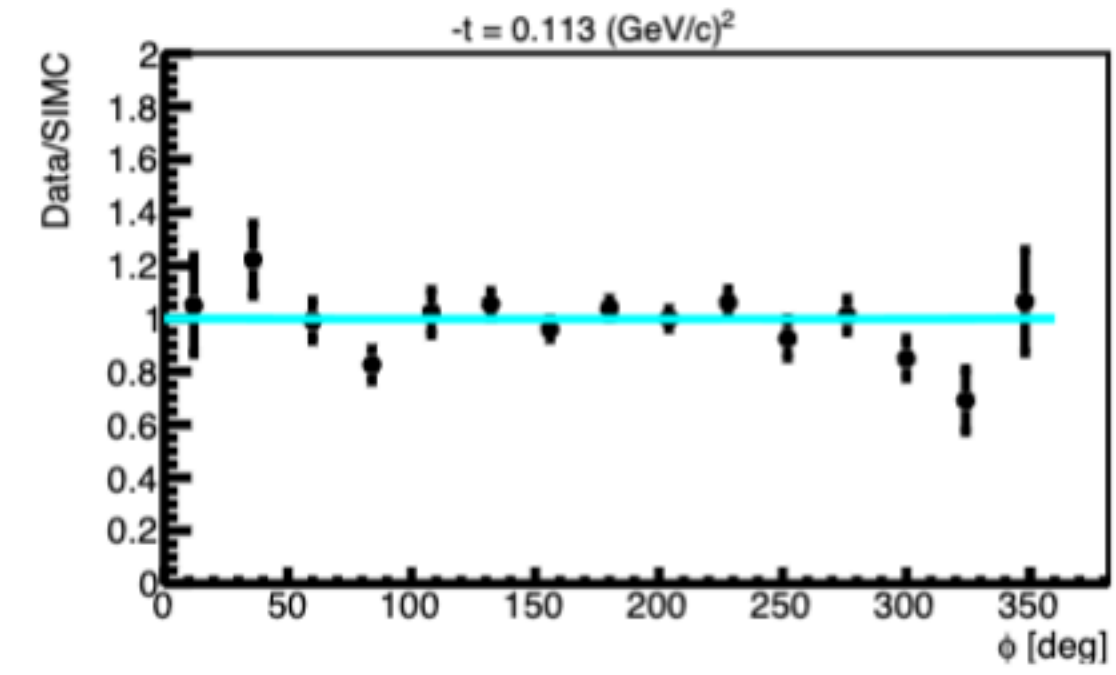
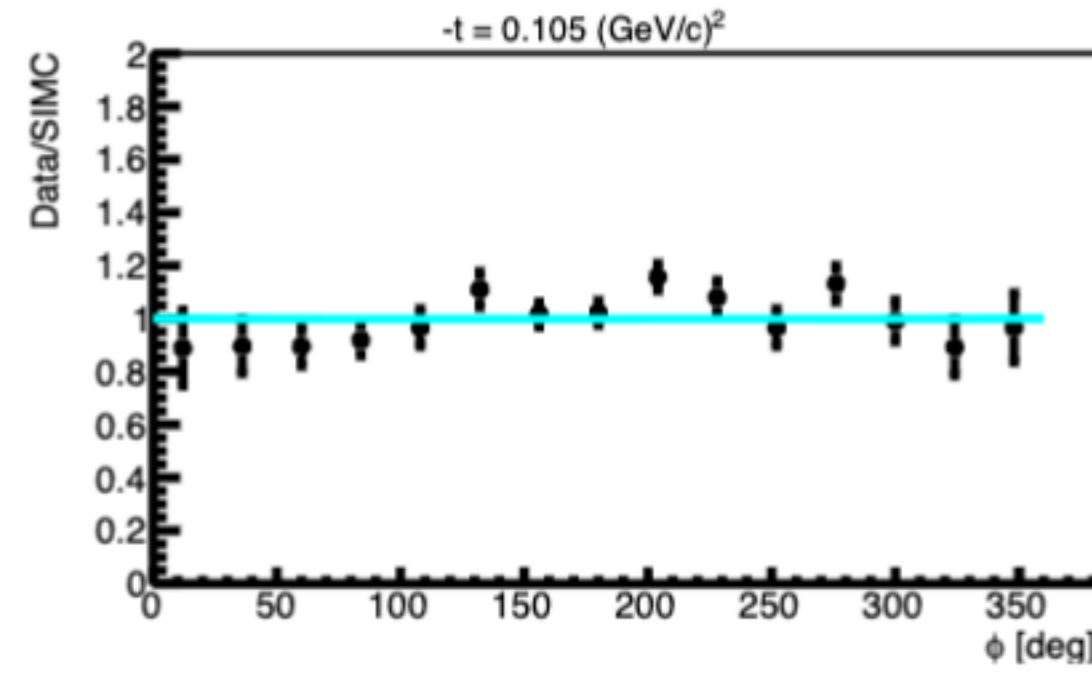
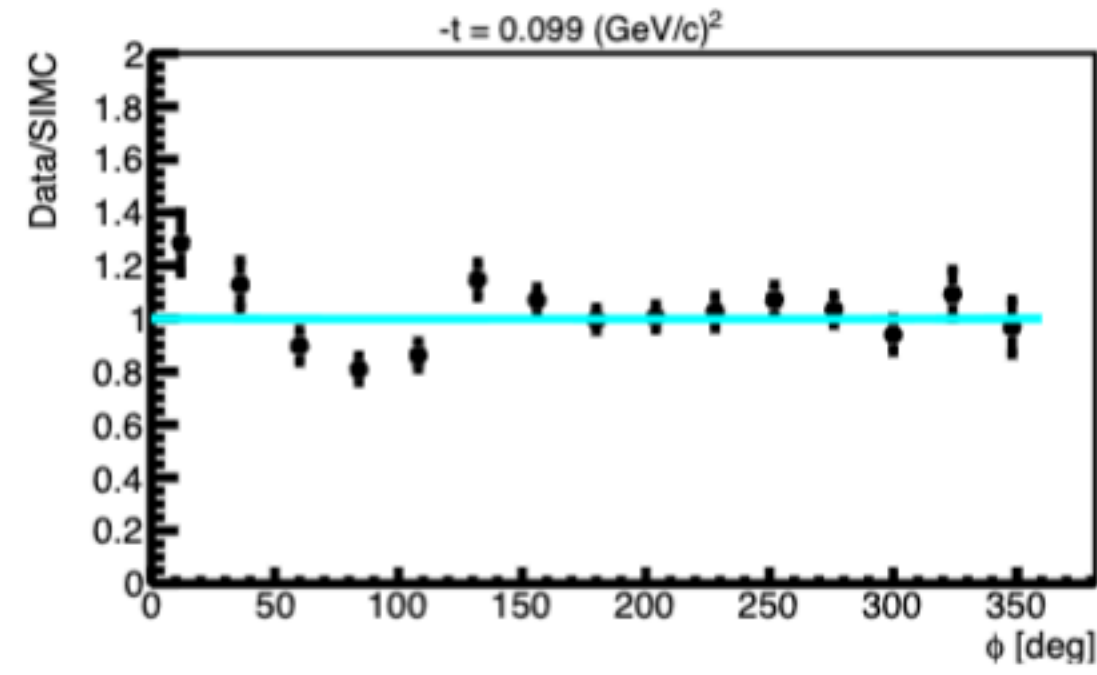
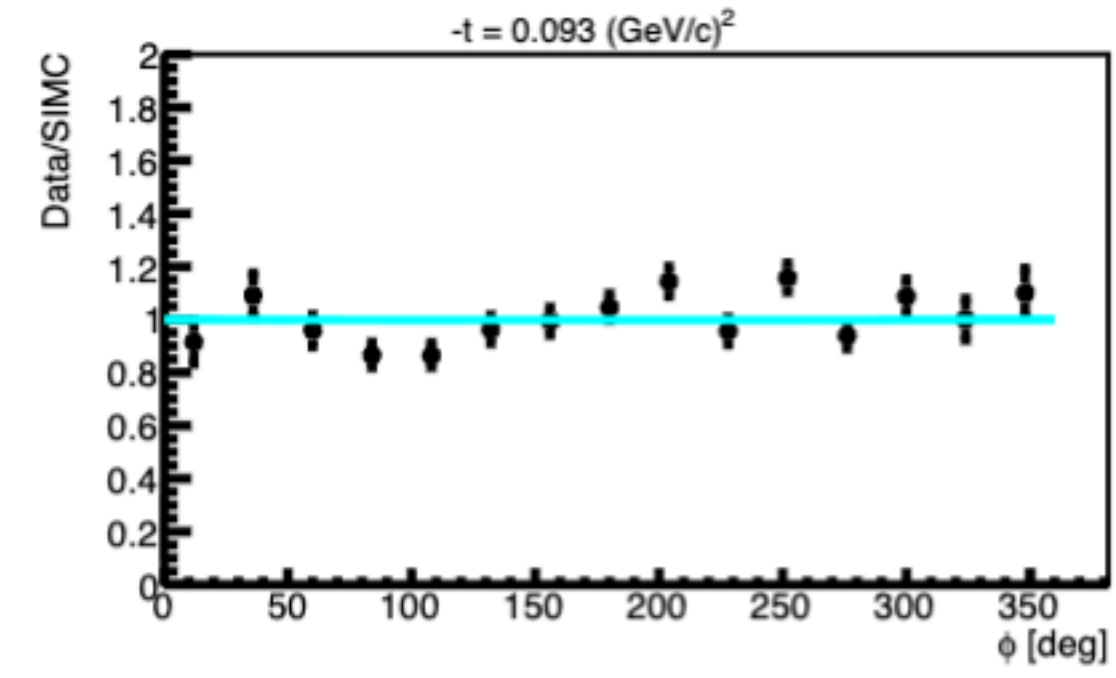
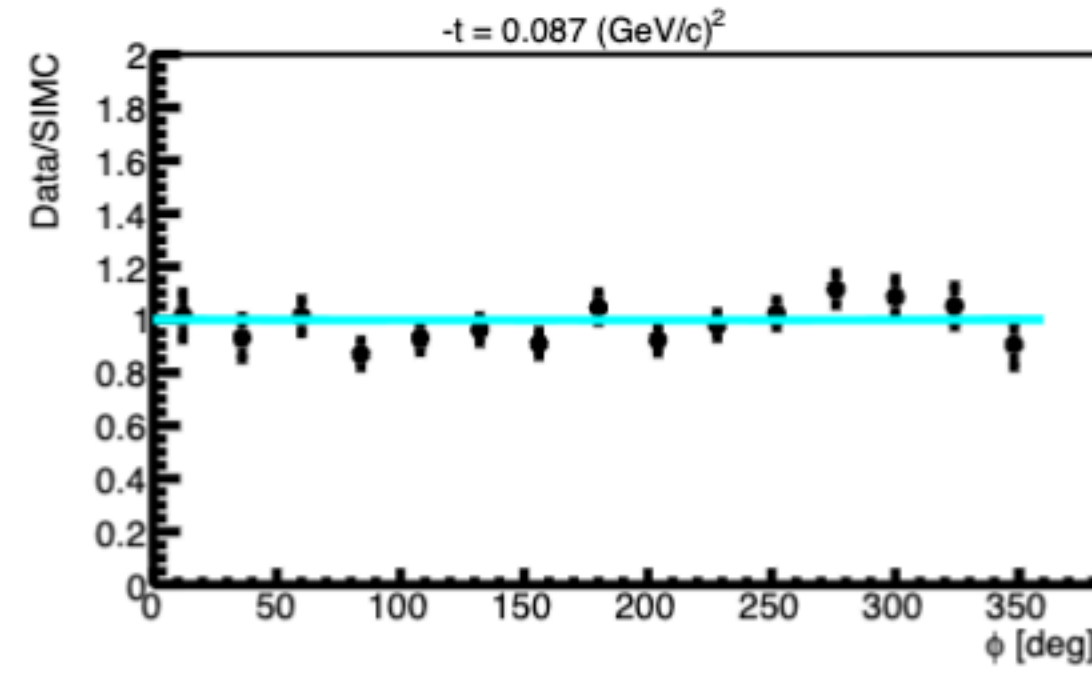
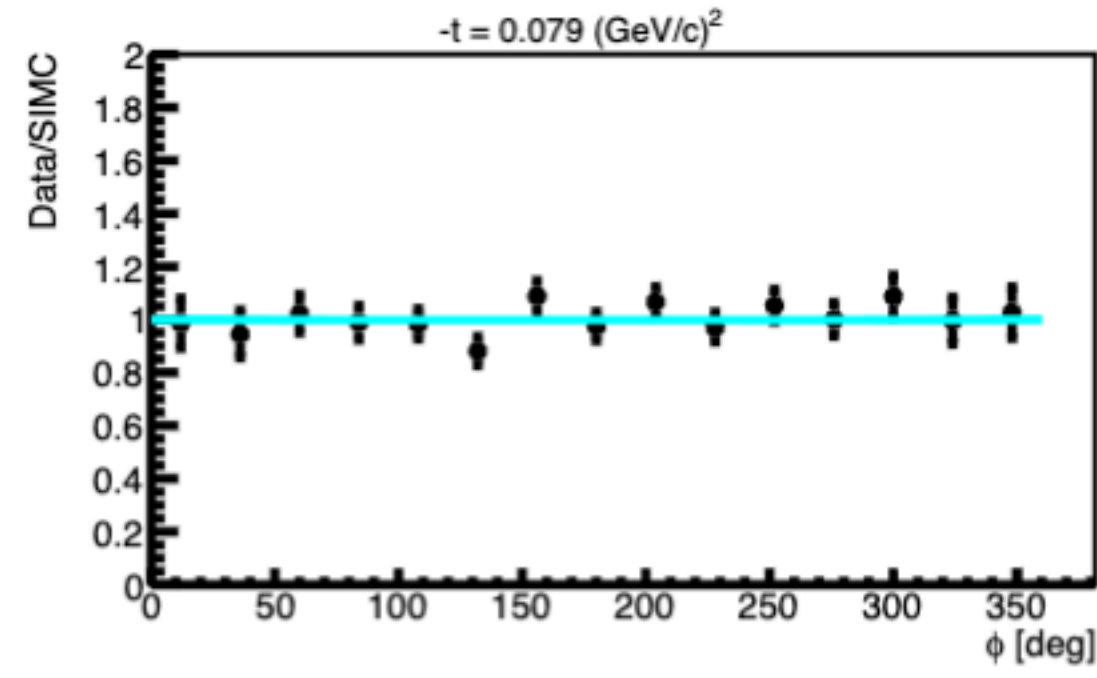
Negligible variation in the fit parameters

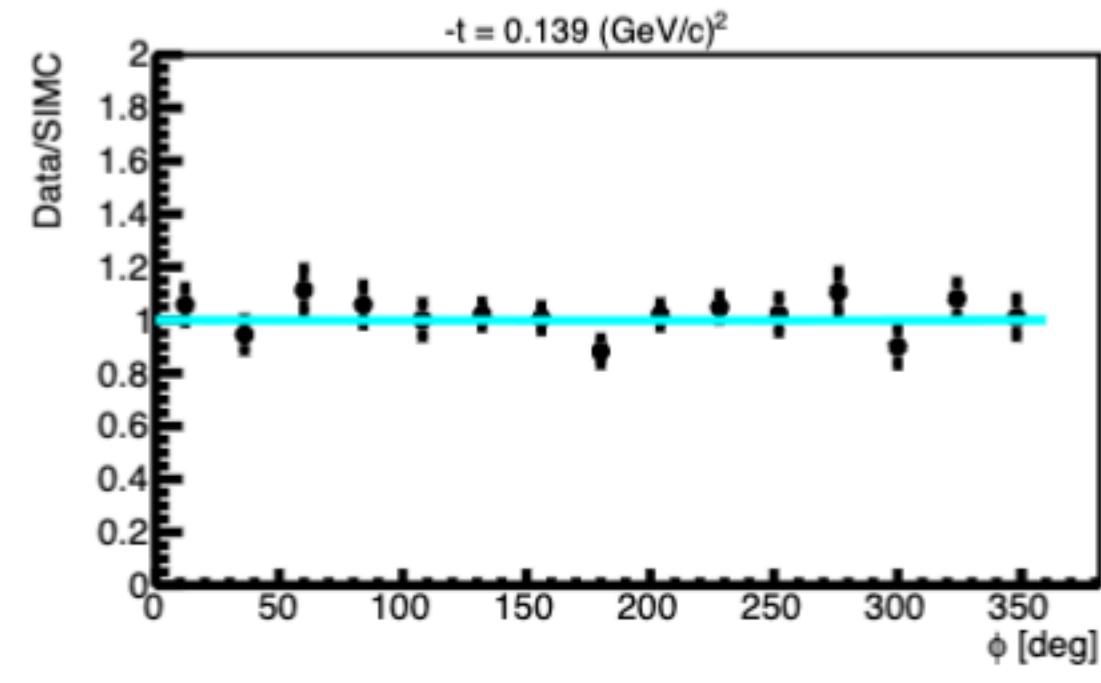
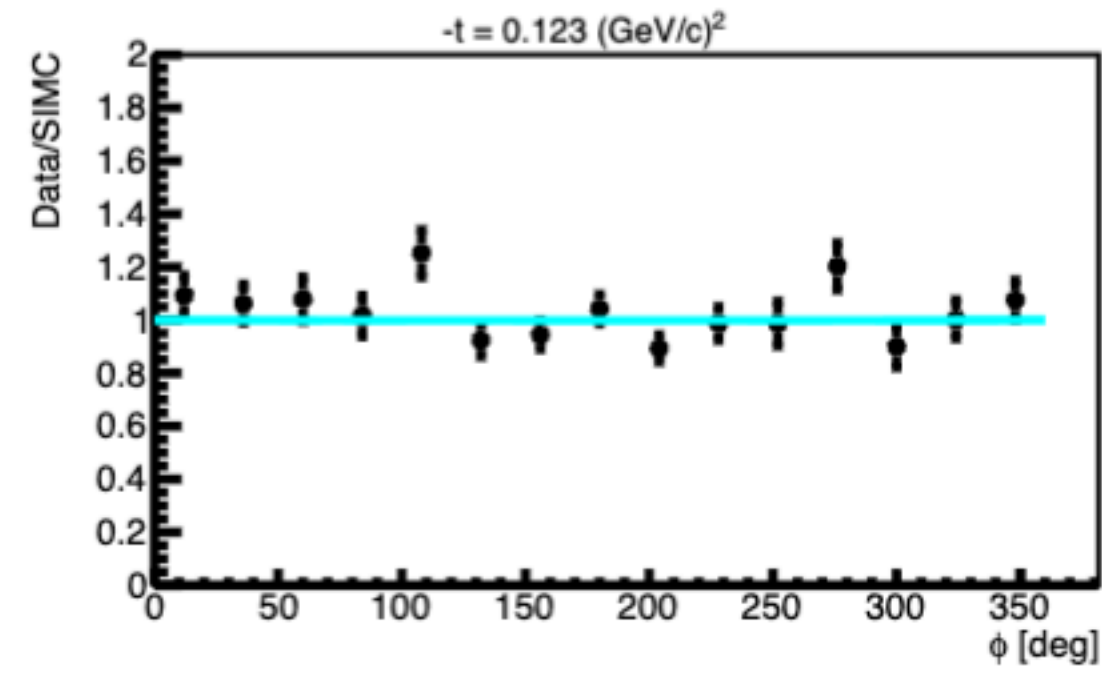
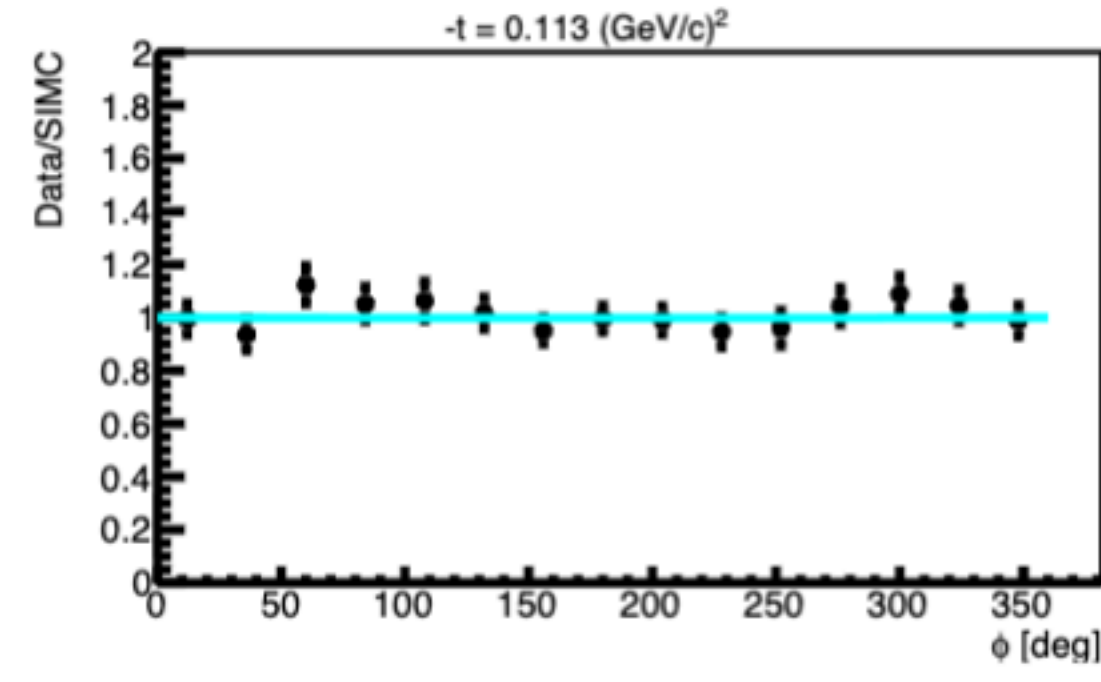
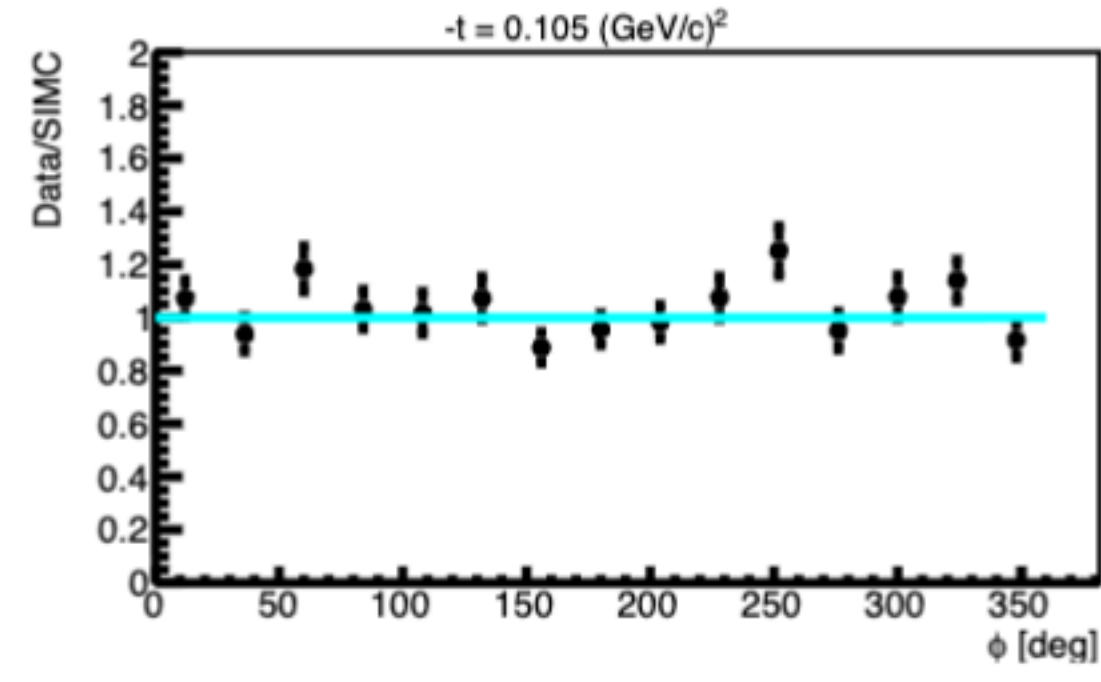
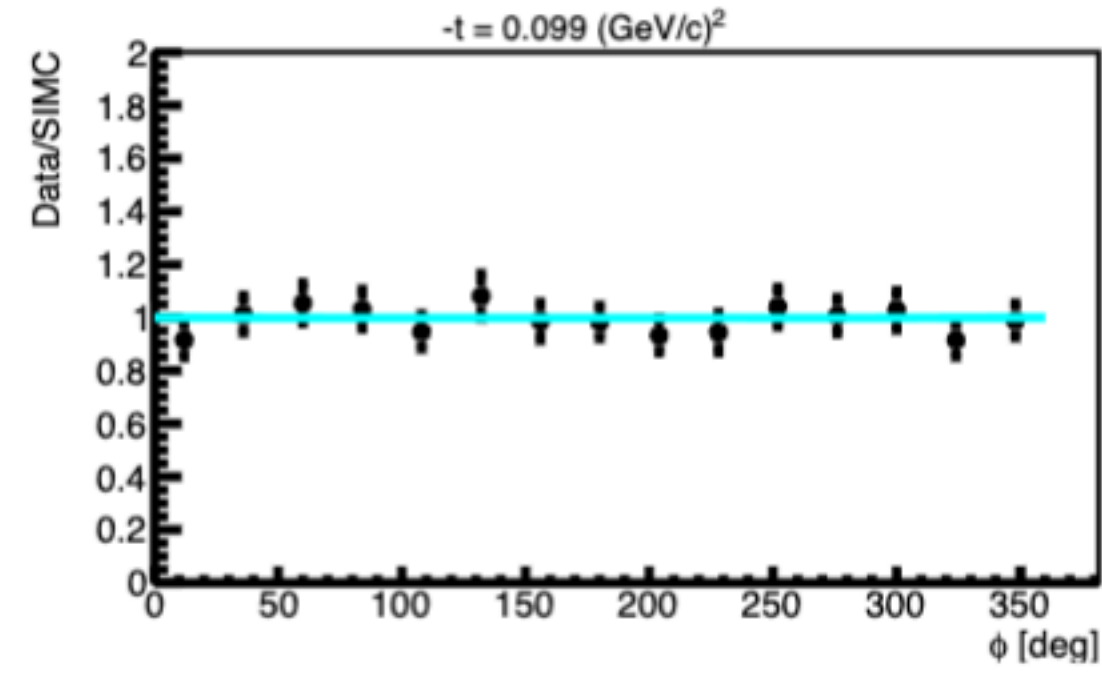
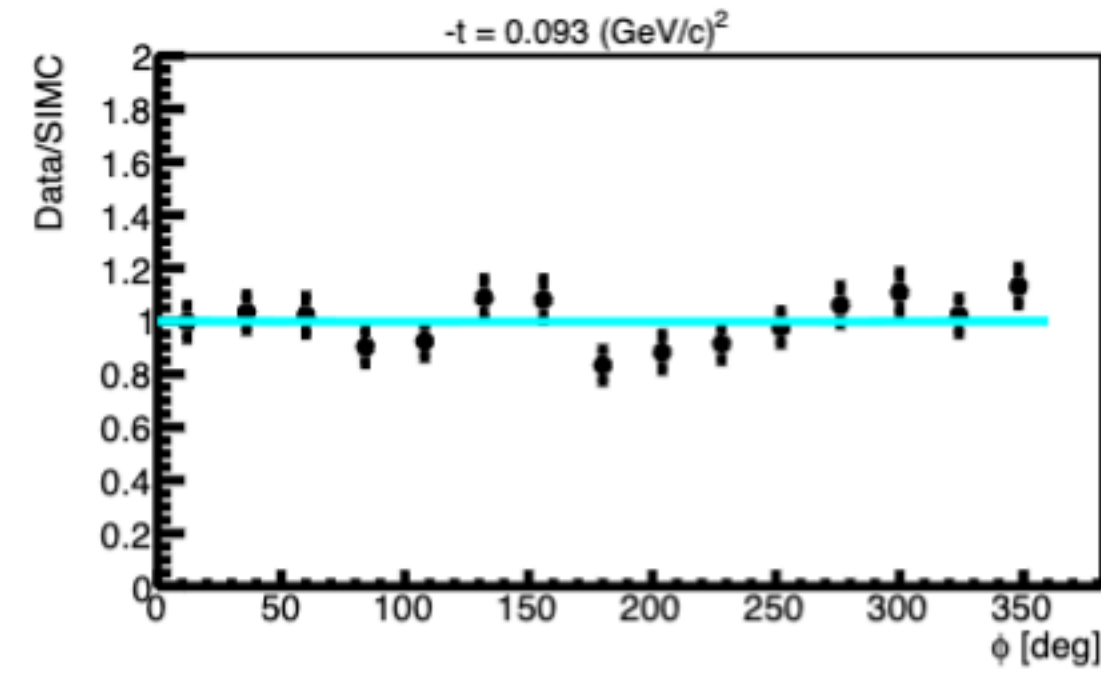
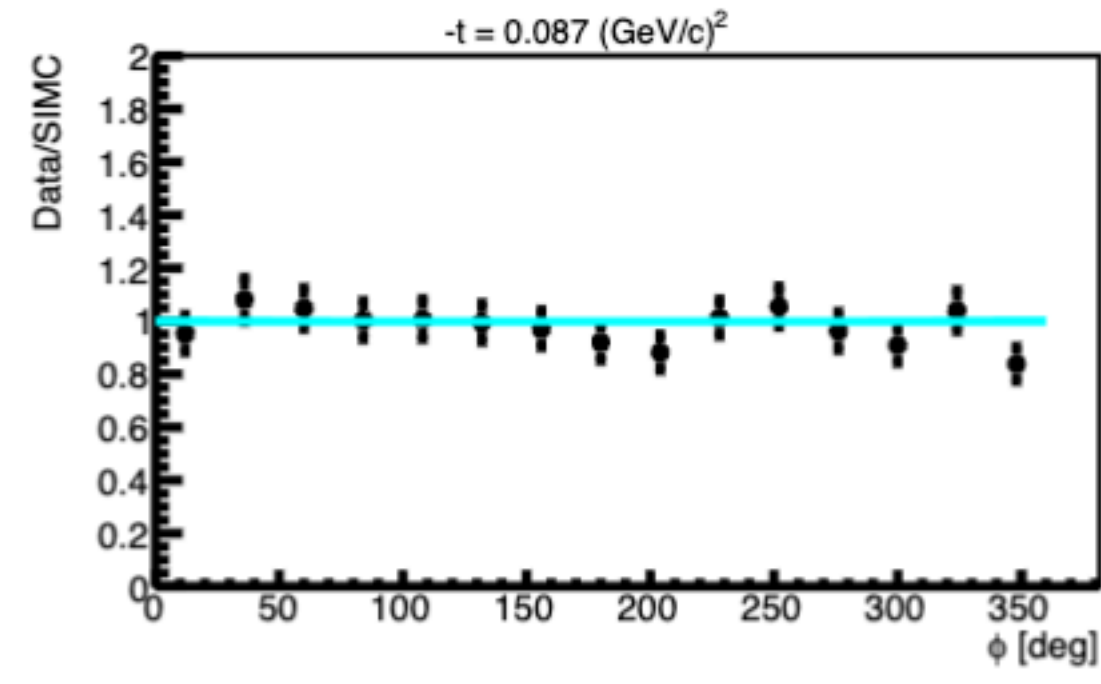
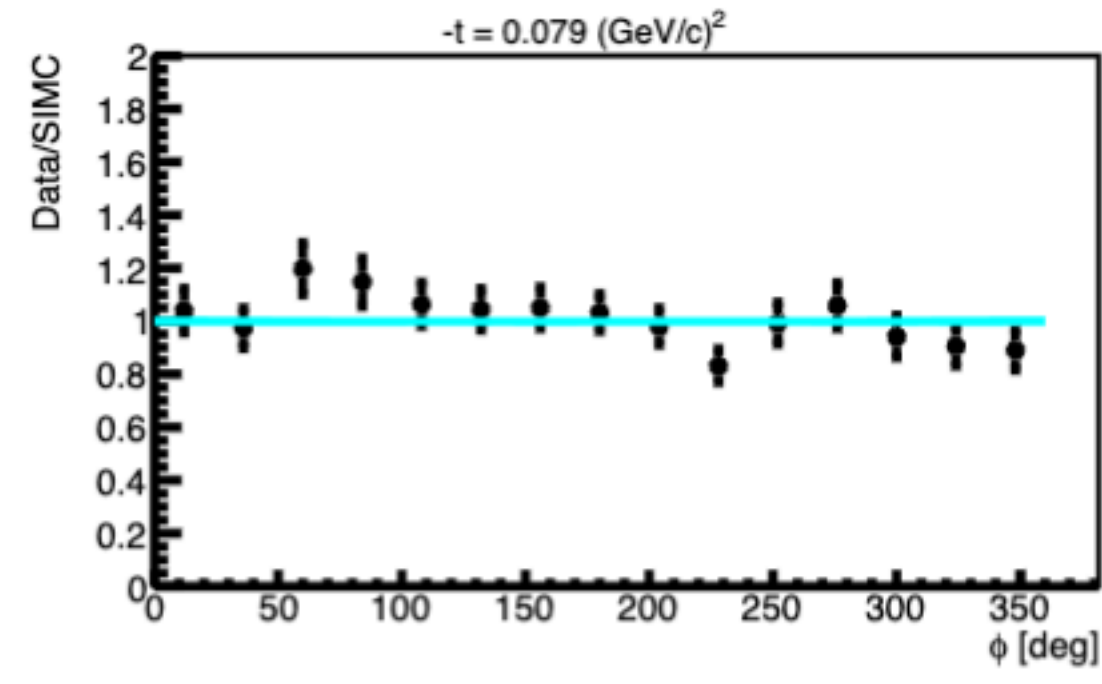
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1.639	1.431	1	1.639	1.431	1
-11.072	7.279	2	-11.072	7.279	2
52.362	7.951	3	52.362	7.951	3
-10.767	1.489	4	-10.767	1.489	4
-8.352	3.521	5	-8.352	3.521	5
-0.550	3.445	6	-0.550	3.445	6
-93.523	77.863	7	-93.523	77.863	7
2.299	6.580	8	2.299	6.580	8

$$2\pi \frac{d^2\sigma}{dt d\phi} = \epsilon \frac{d\sigma_L}{dt} + \frac{d\sigma_T}{dt} + \sqrt{2\epsilon(\epsilon + 1)} \frac{d\sigma_{LT}}{dt} \cos\phi + \epsilon \frac{d\sigma_{TT}}{dt} \cos 2\phi$$

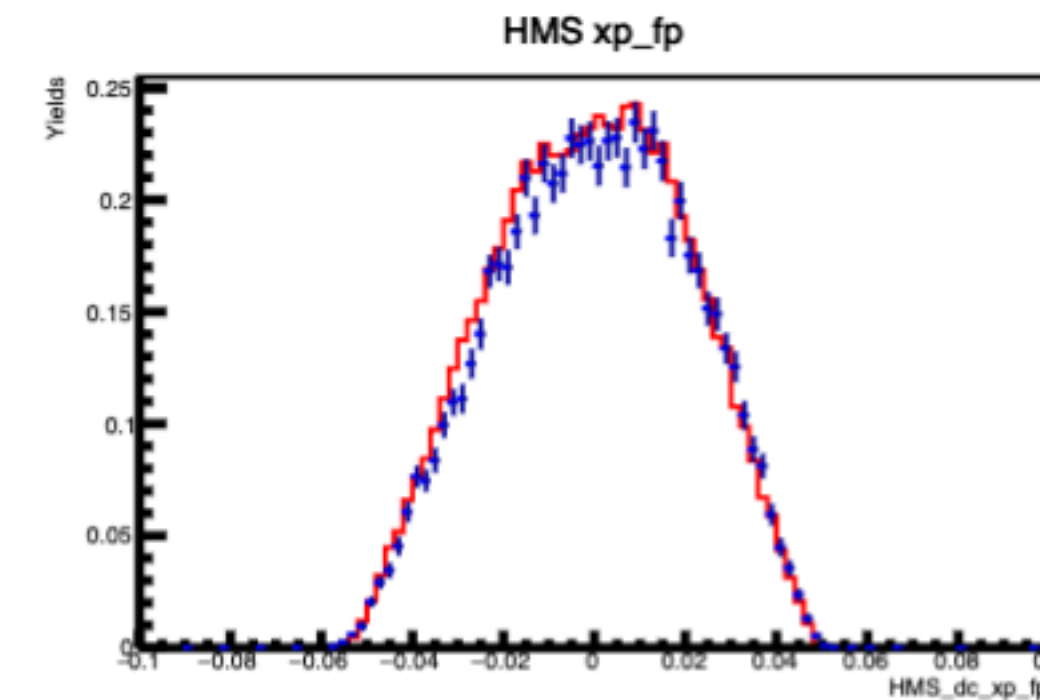
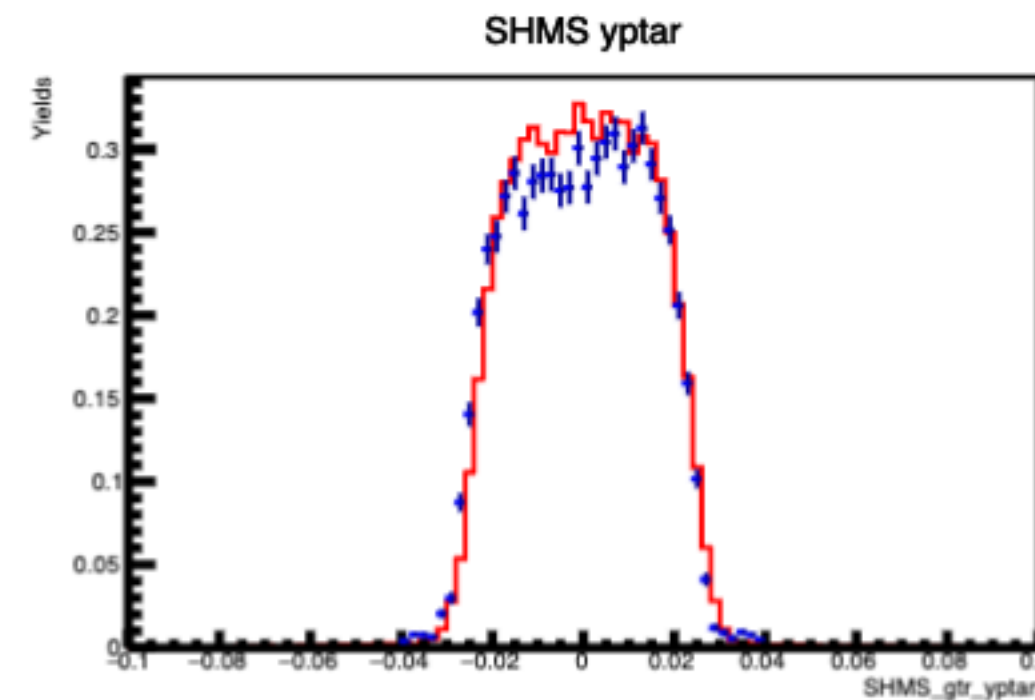
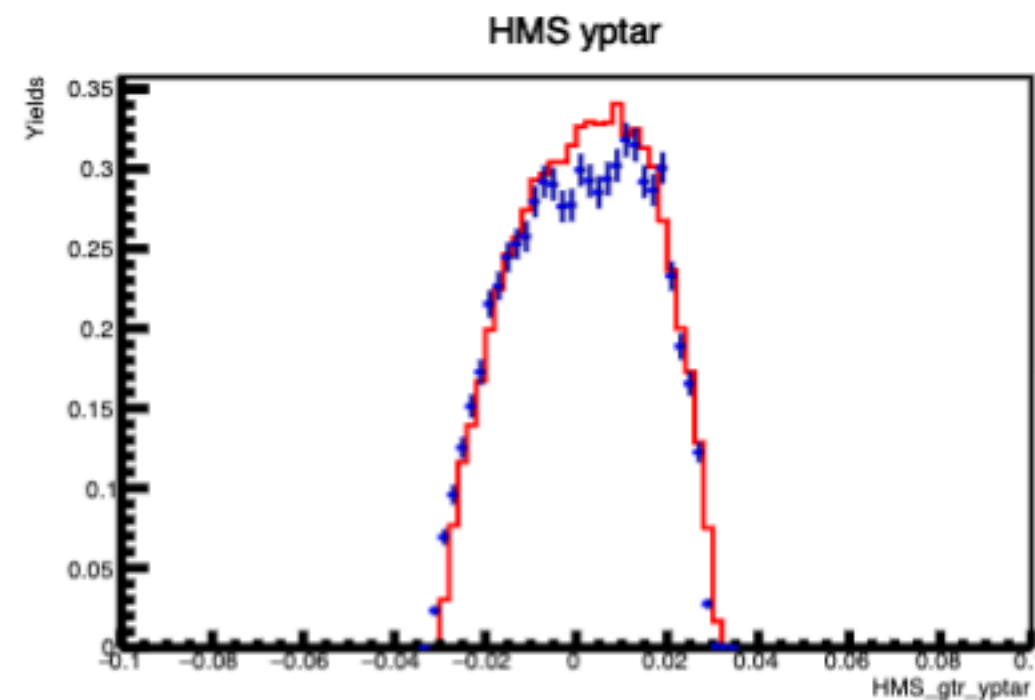
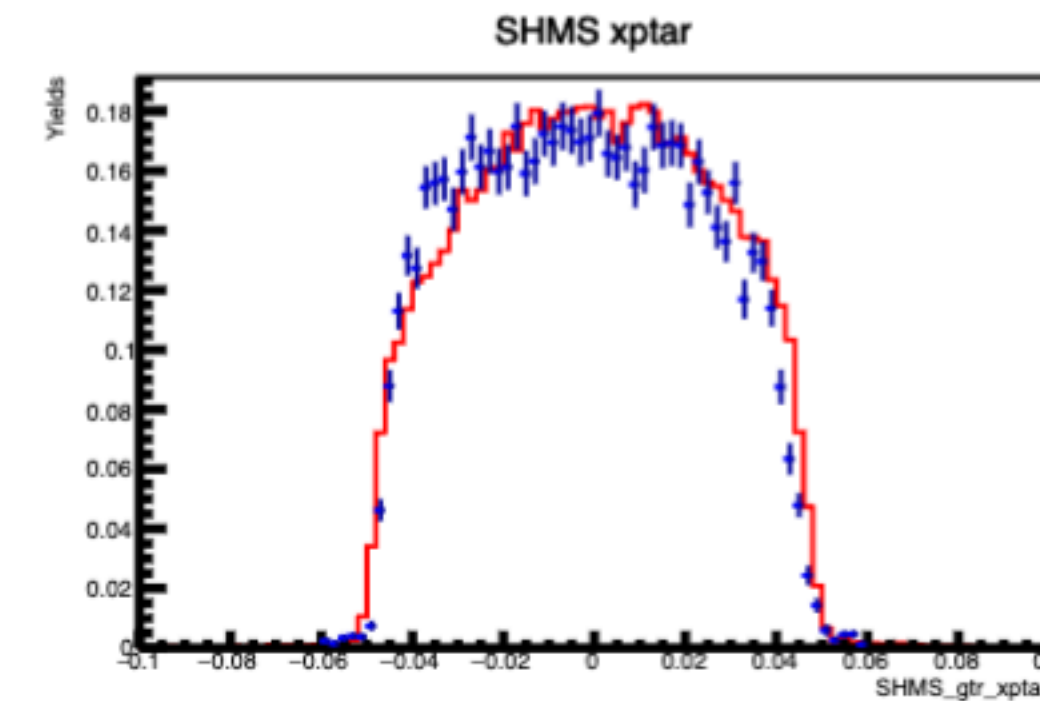
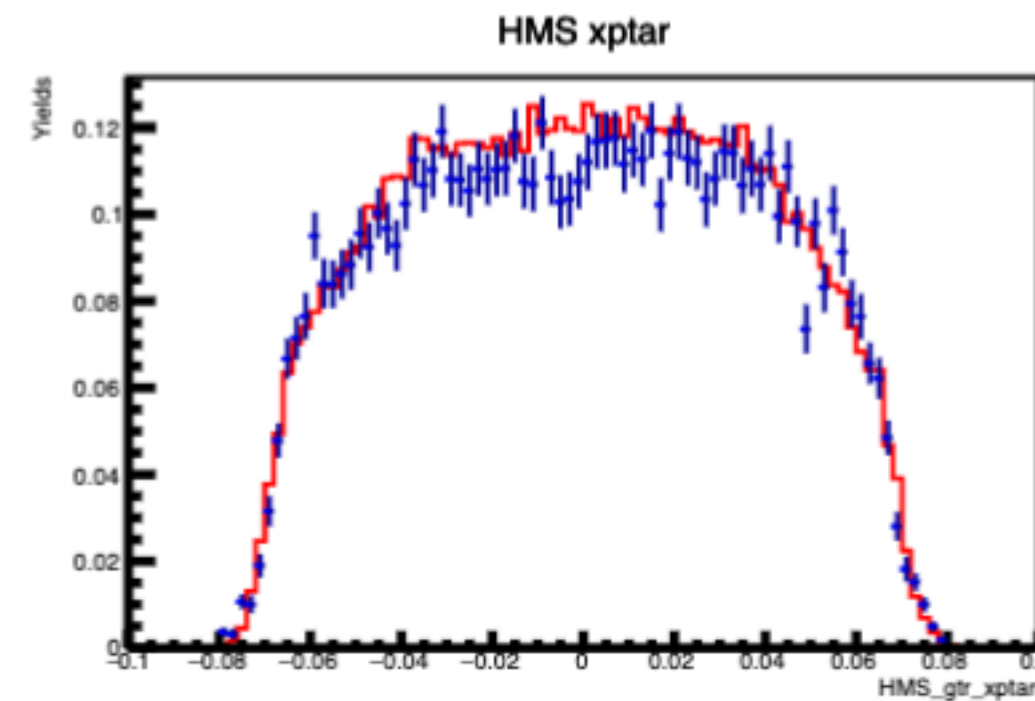
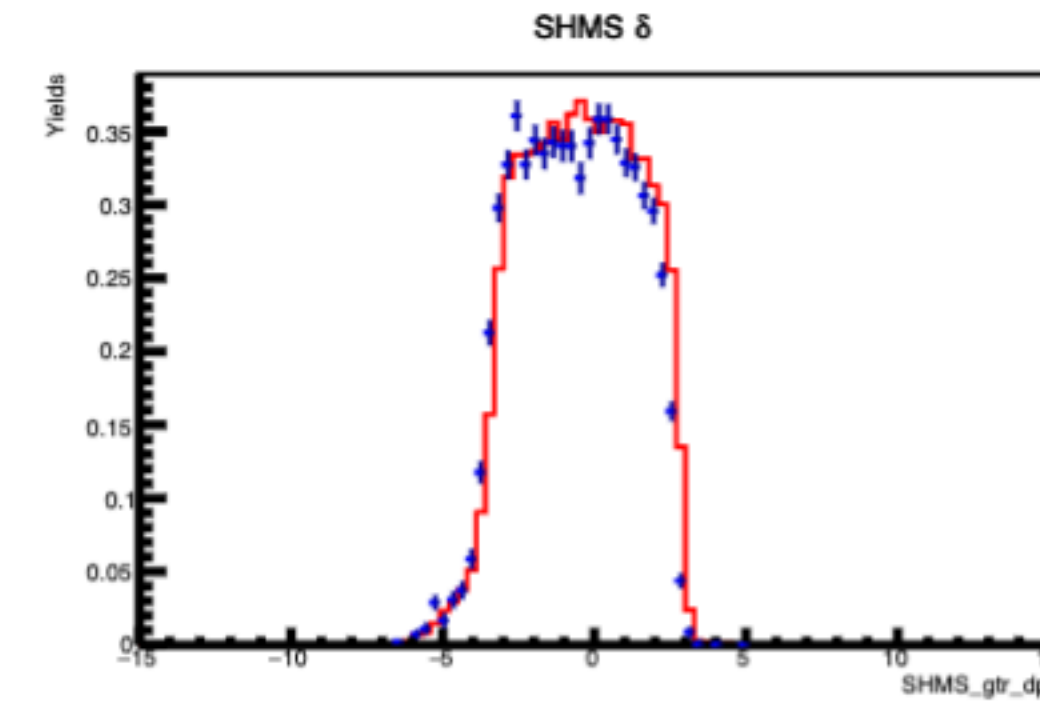
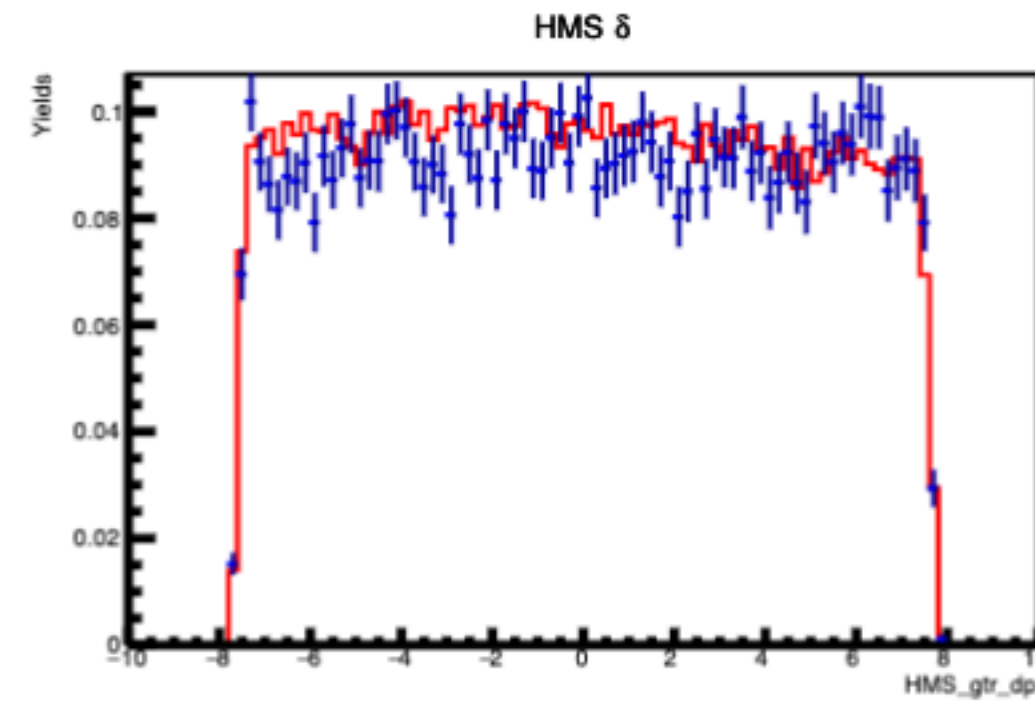


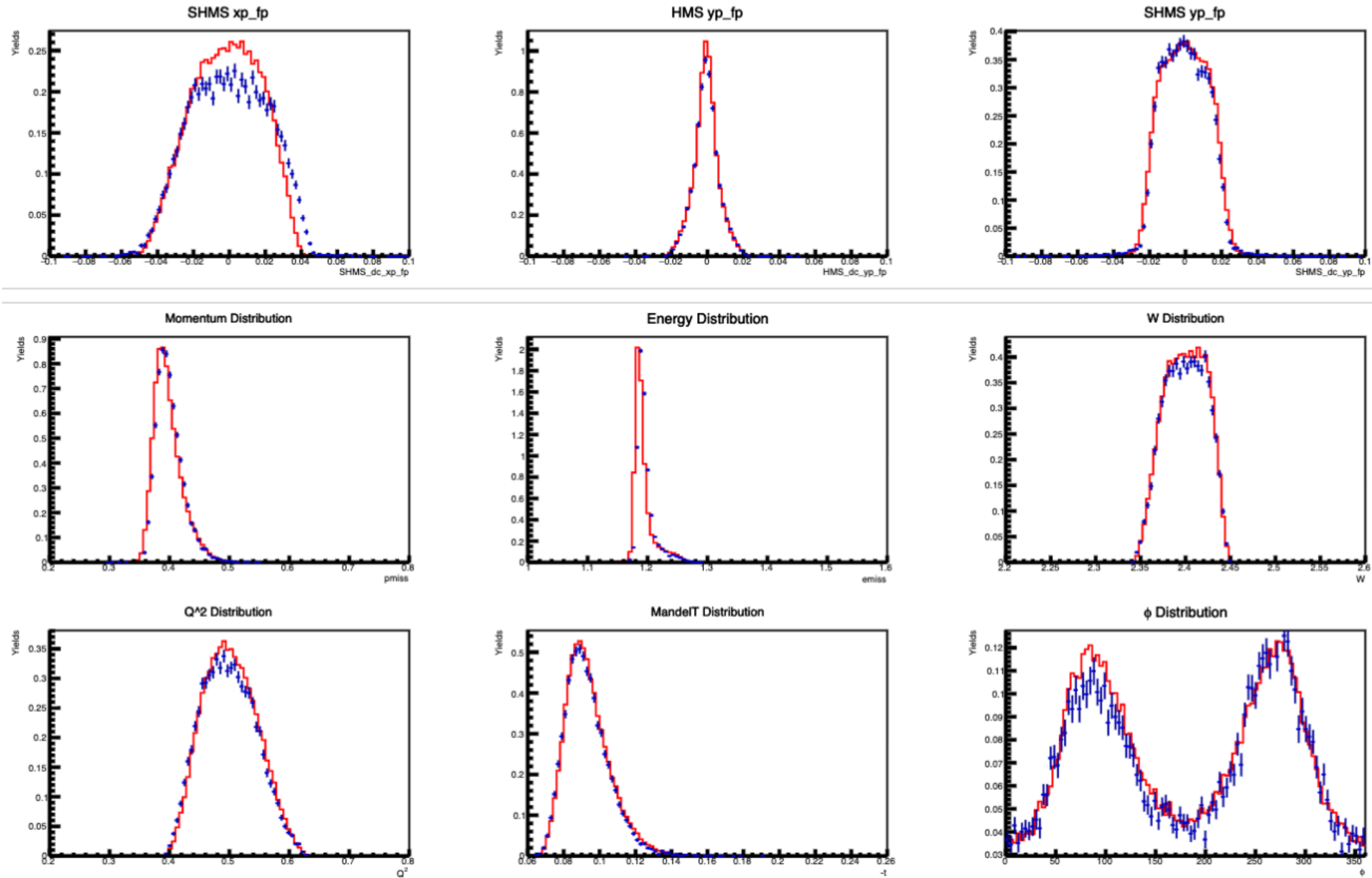






center_lowe
 $\Lambda(1116)$
Beam Energy = 3.834 GeV
 $Q^2 = 0.499 \text{ GeV}^2$
 $P_{\text{HMS}} = 0.968 \text{ GeV}/c$
 $\theta_{\text{HMS}} = 21.140^\circ$
 $P_{\text{SHMS}} = 2.583 \text{ GeV}/c$
 $\theta_{\text{SHMS}} = 6.790^\circ$
Red = SIMC
Blue = DATA





$$p(e, e'K^+)\Sigma^0$$

$$\frac{d\sigma_L}{dt} = \frac{p_0 |t|}{(|t| + m_k^2)^2} e^{-p_1 |t|}$$

$$\frac{d\sigma_T}{dt} = p_2 e^{-|p_3 t|}$$

$$\frac{d\sigma_{LT}}{dt} = p_4 e^{-p_5 |t|} \sin(\theta)$$

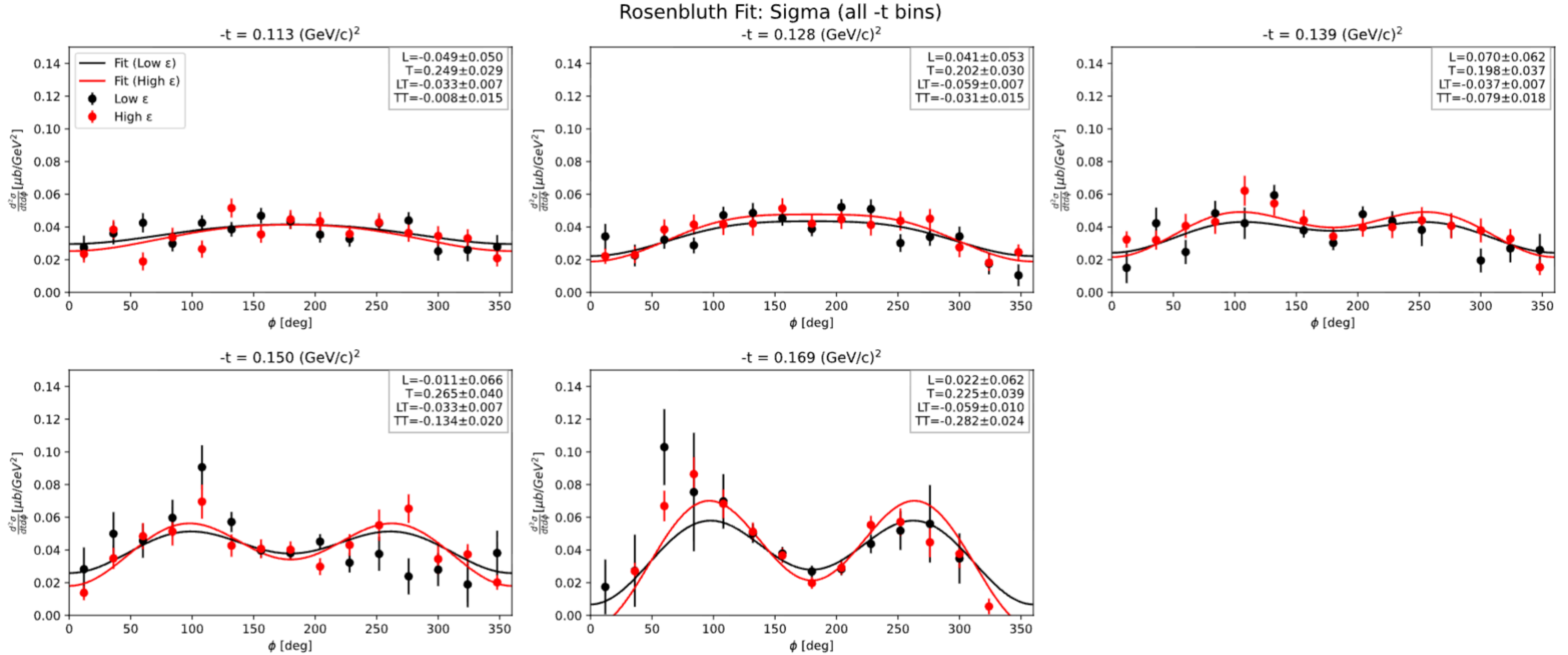
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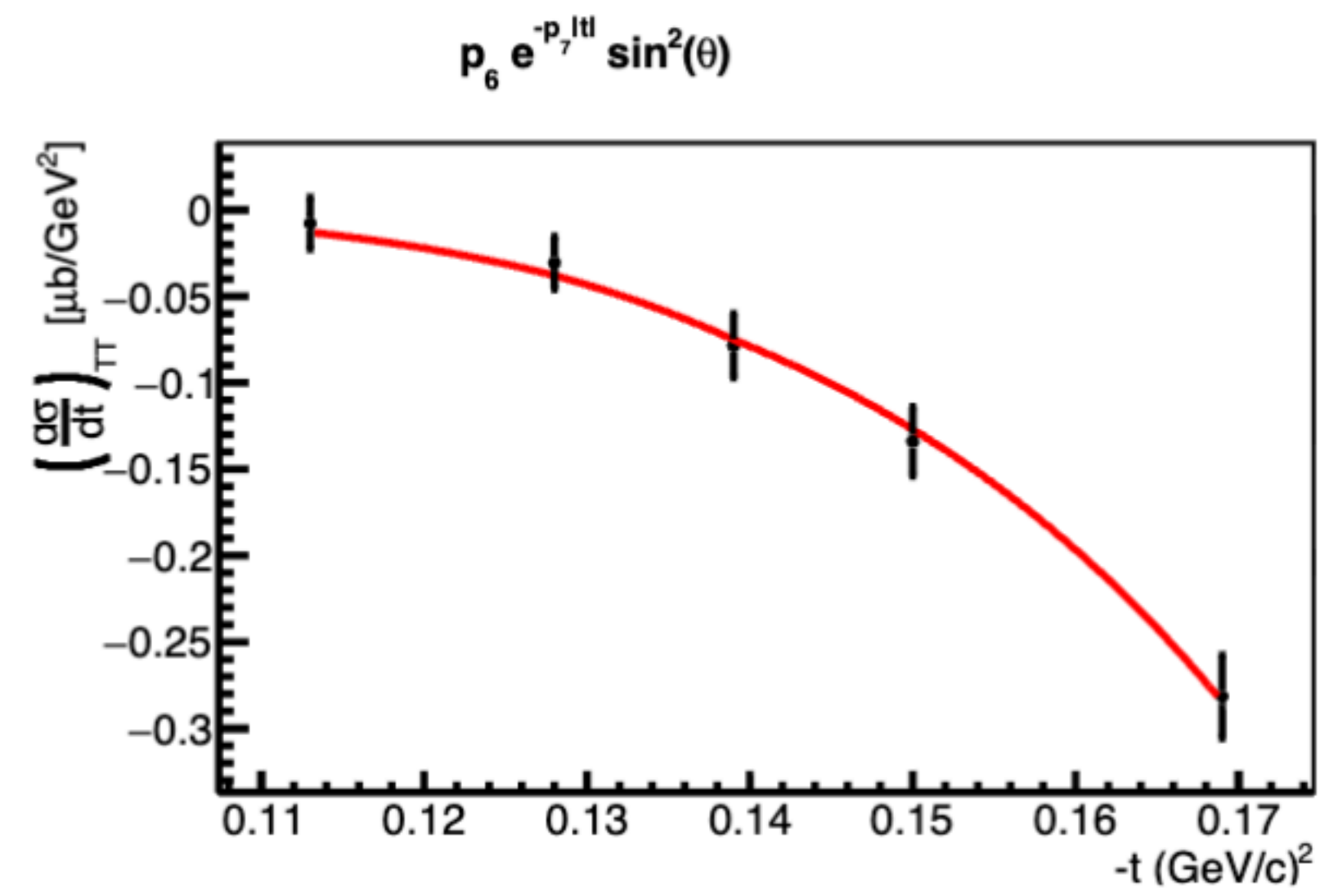
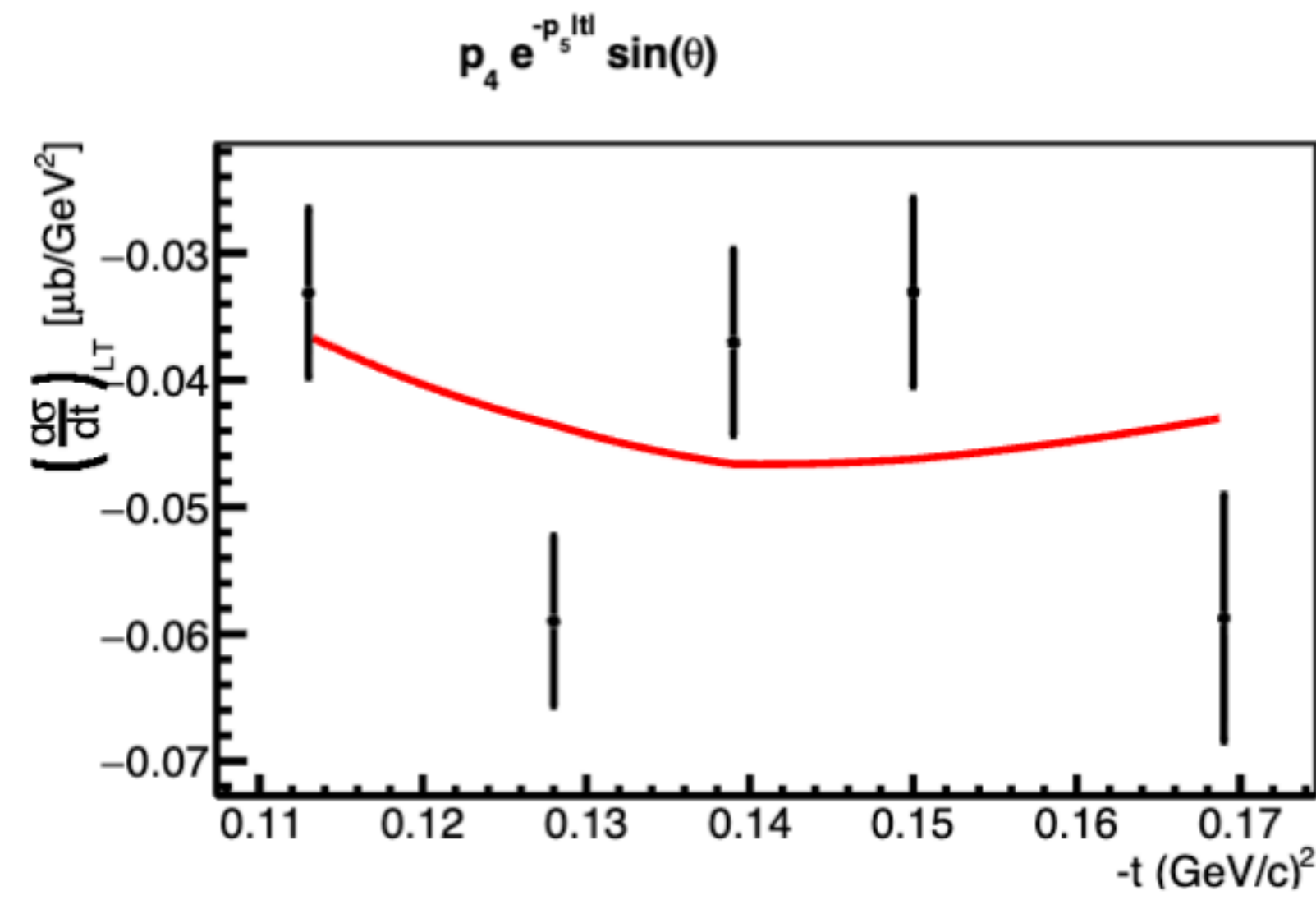
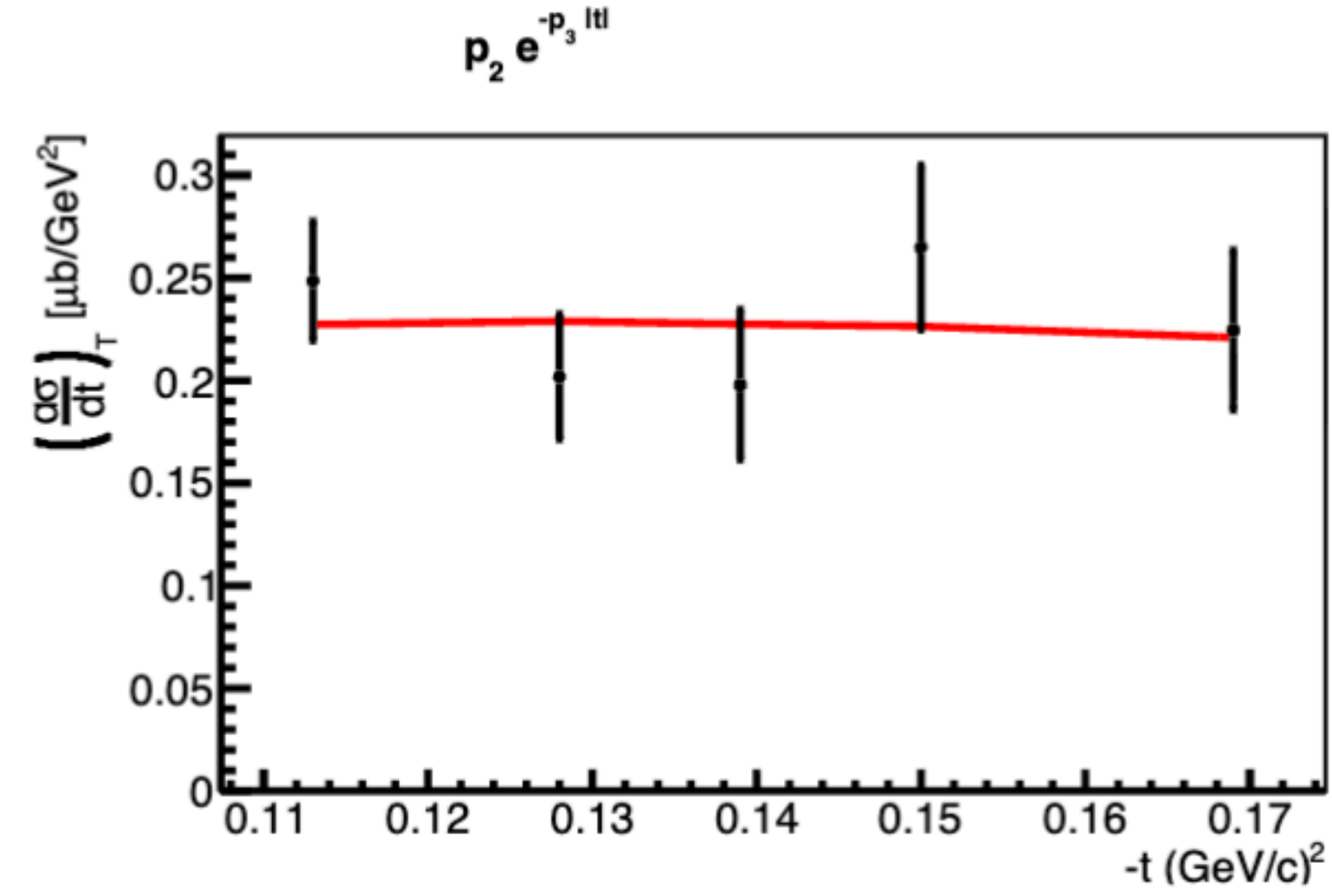
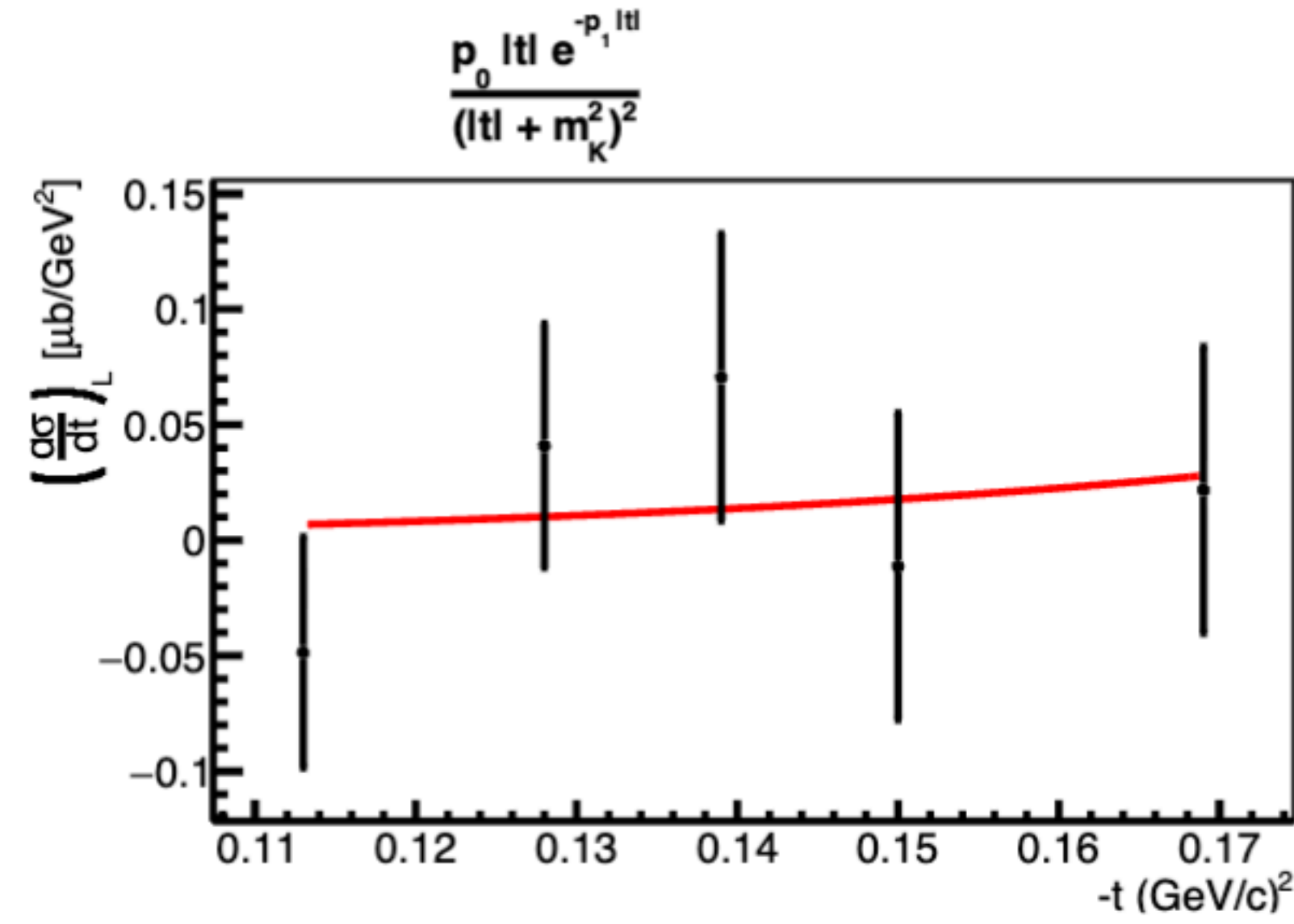
$$W_{factor} = \frac{1}{(W^2 - m_p^2)^2}$$

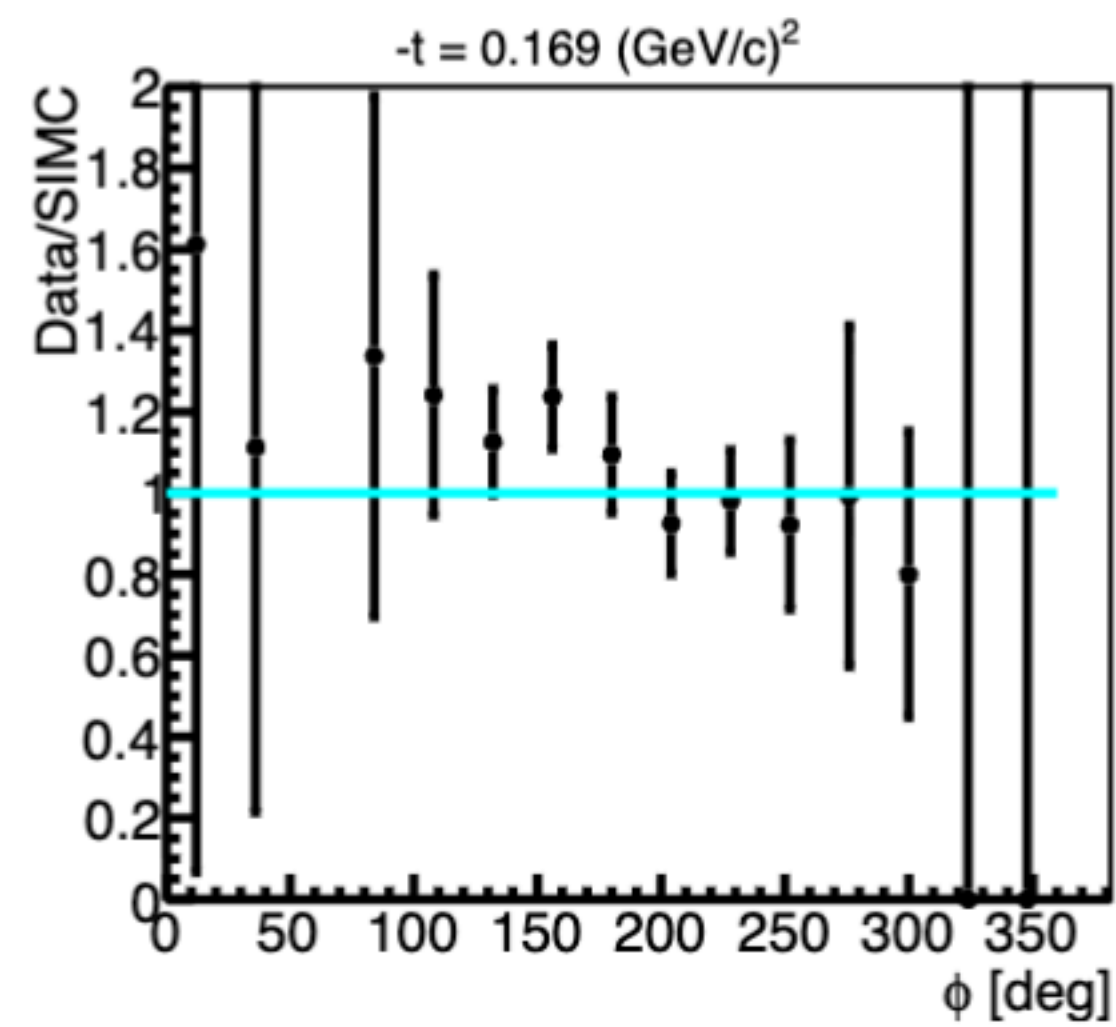
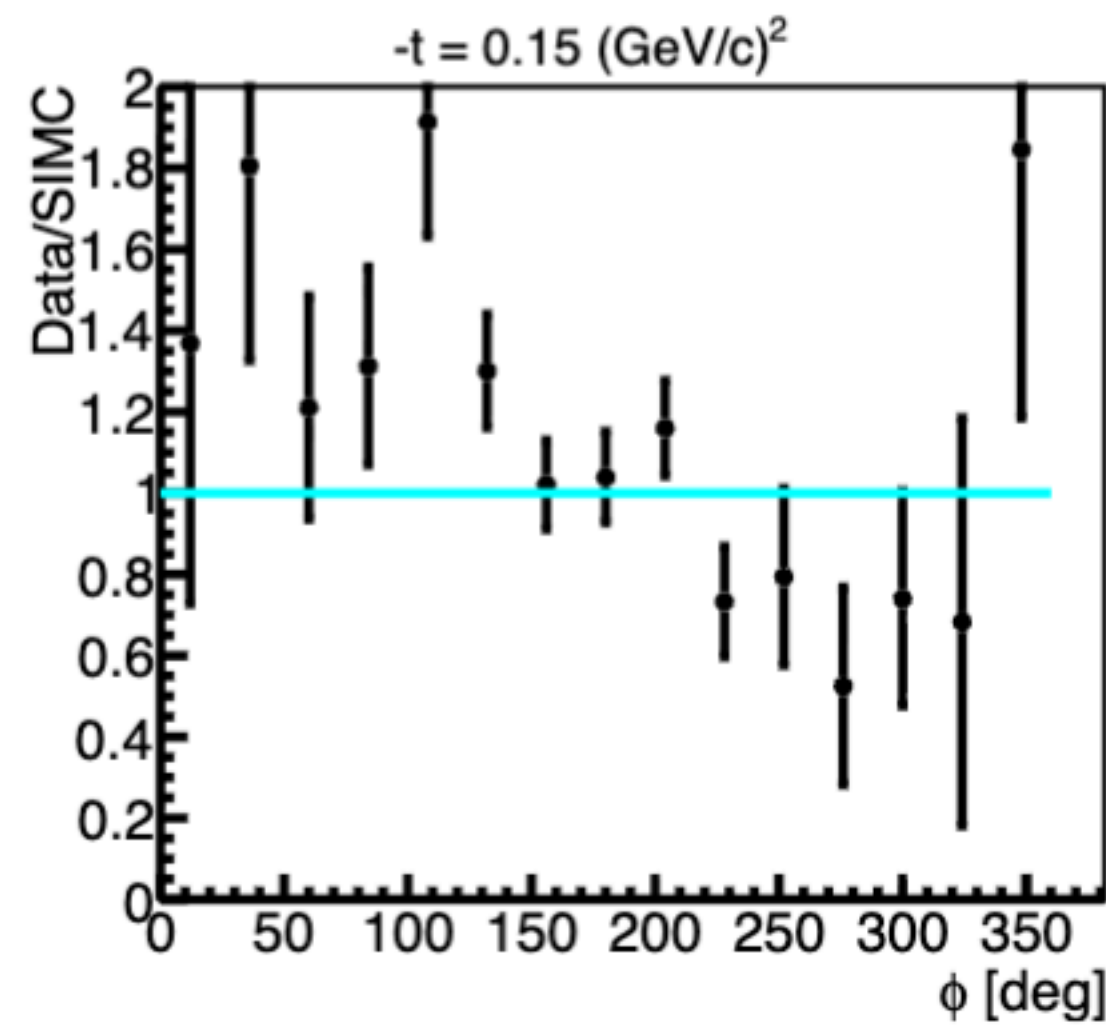
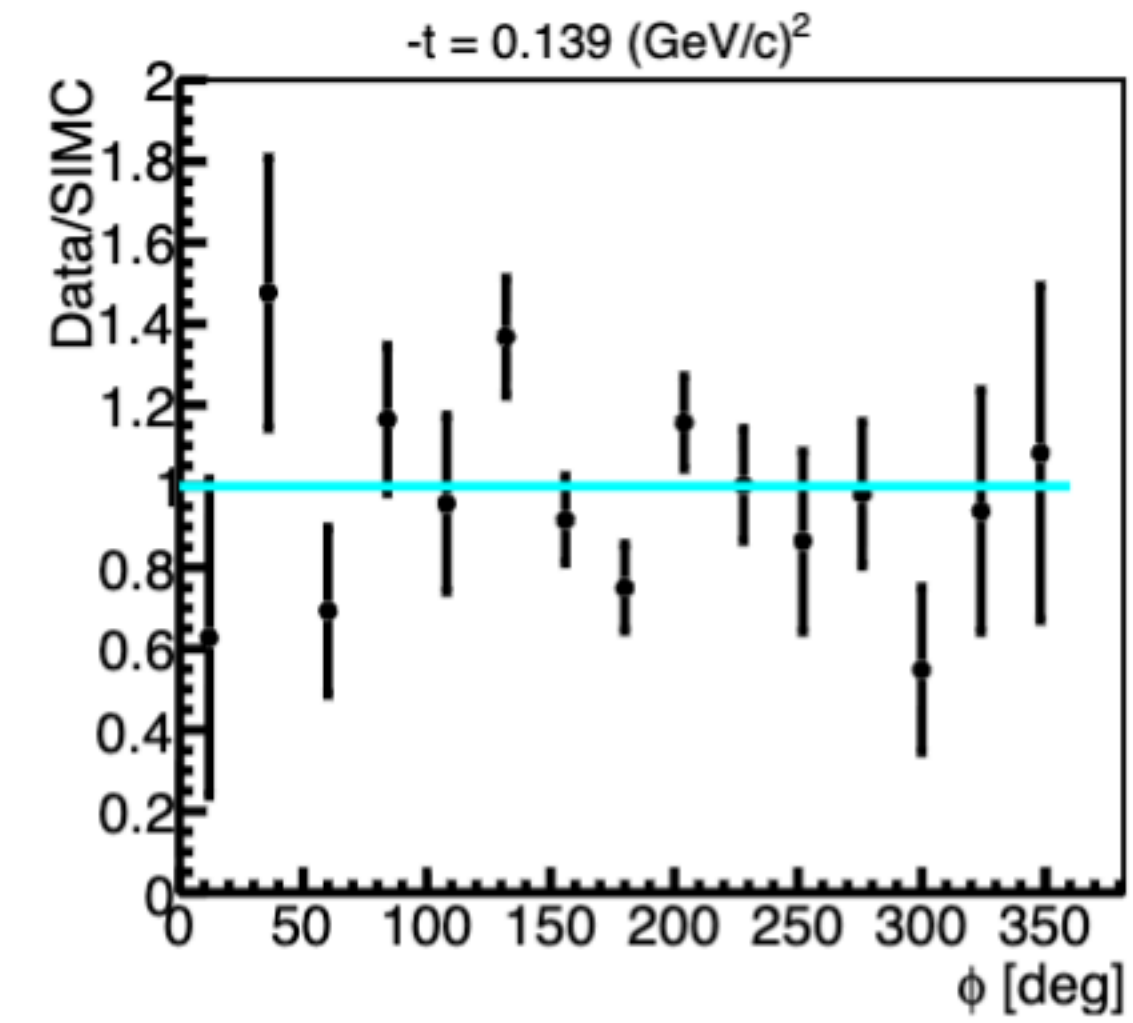
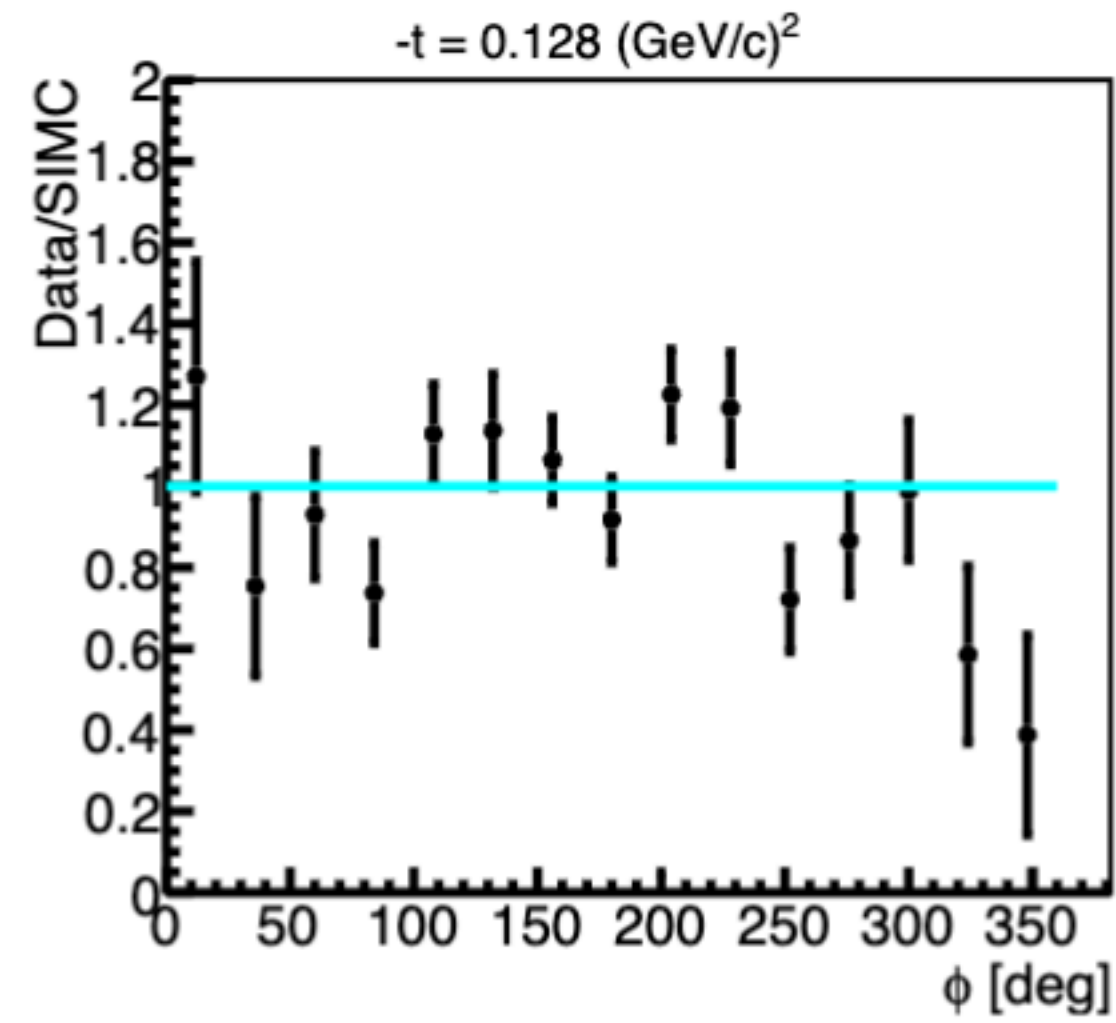
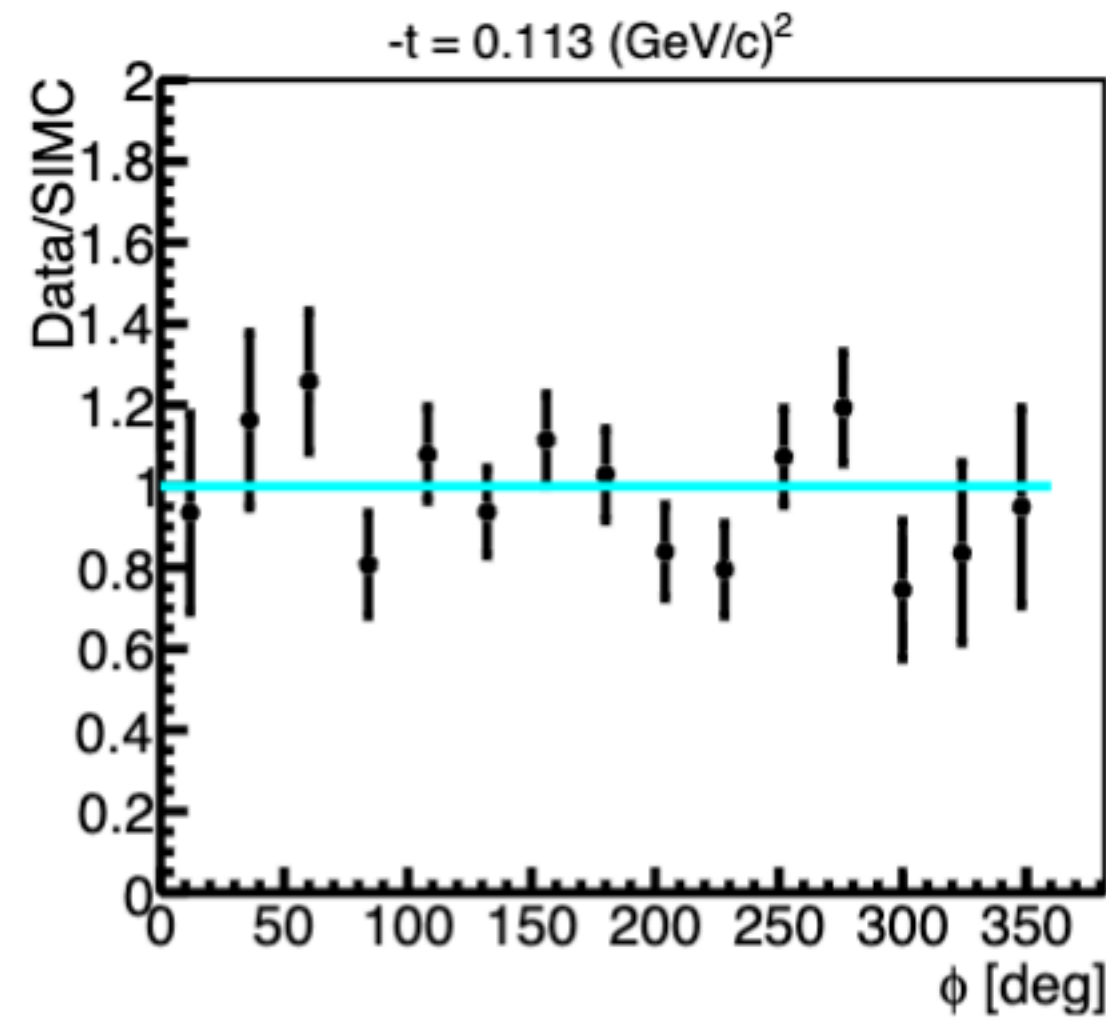
Negligible variation in the fit parameters

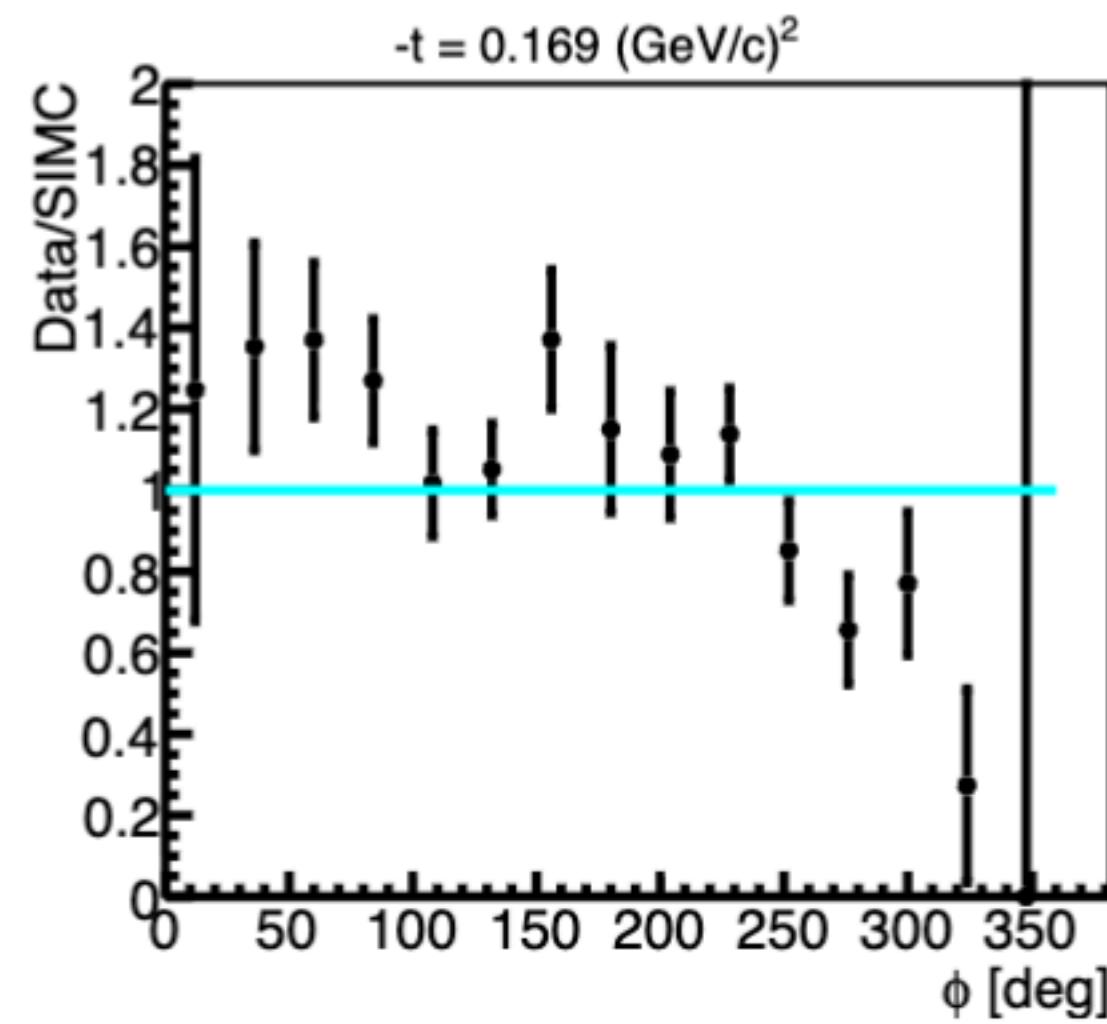
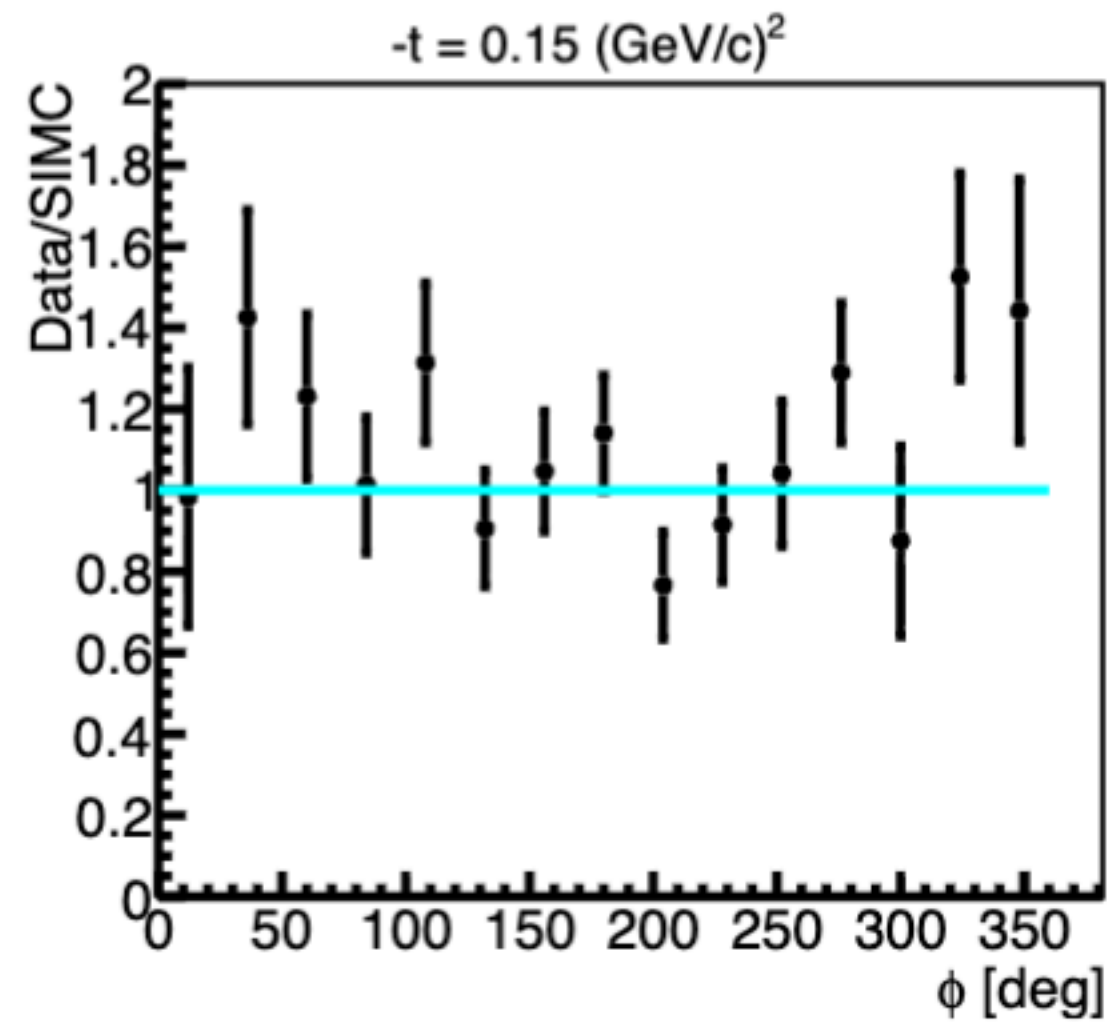
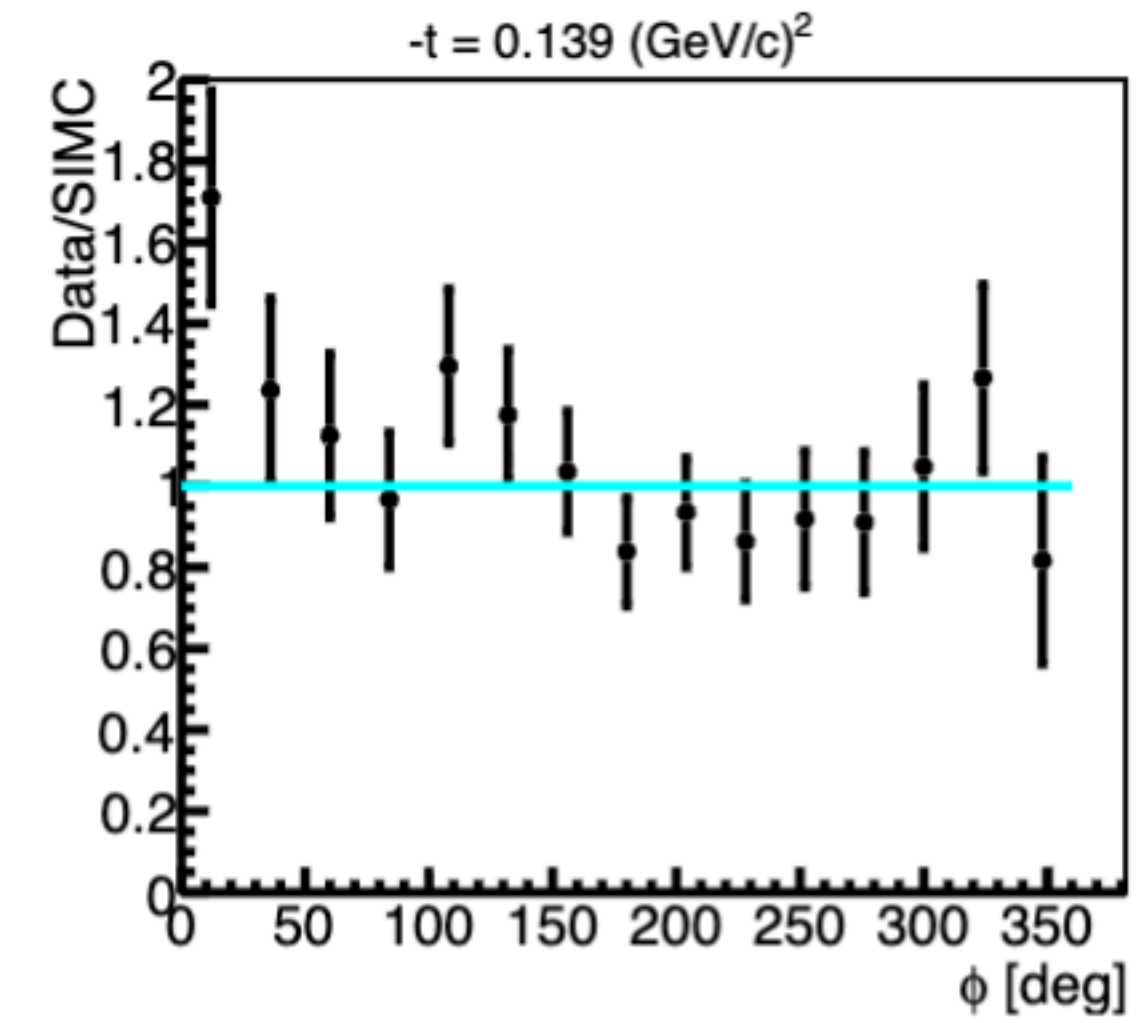
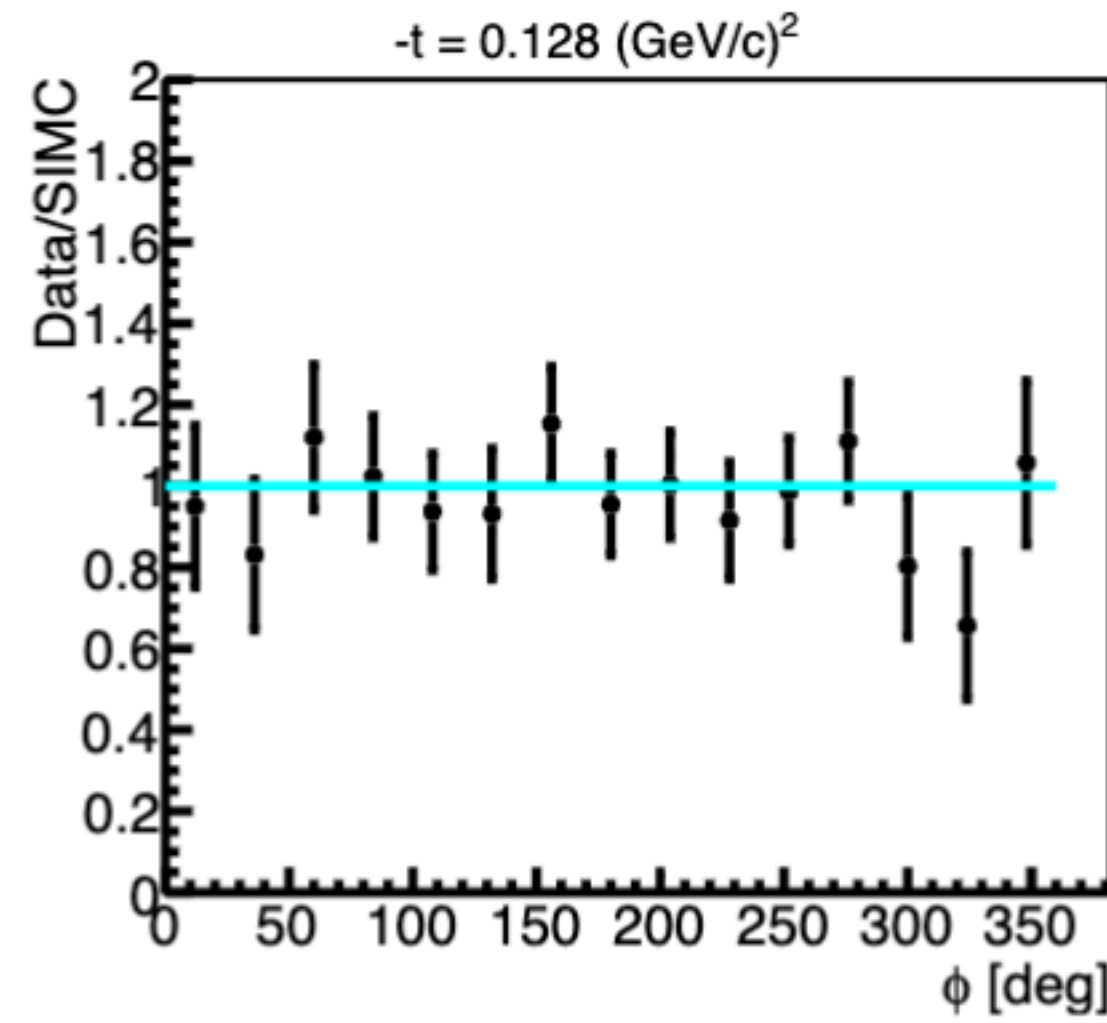
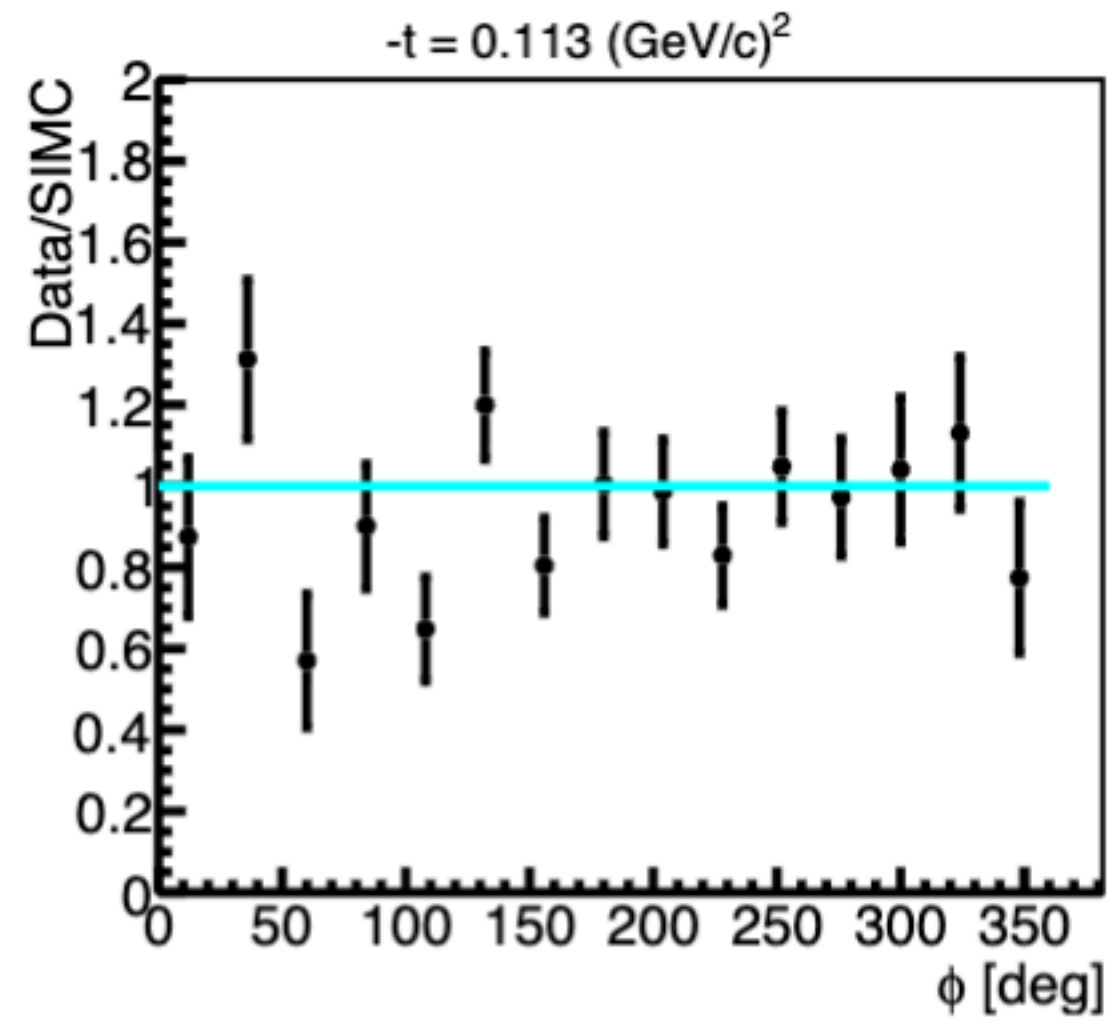
--- iteration 01 parameters ---			----- iteration 02 parameters ---		
0.014	0.134	1	0.014	0.134	1
-22.831	61.146	2	-22.831	61.146	2
6.298	3.192	3	6.298	3.192	3
-1.123	3.721	4	-1.123	3.721	4
-56.272	36.879	5	-56.272	36.879	5
15.253	4.731	6	15.253	4.731	6
-4.409	3.945	7	-4.409	3.945	7
-19.523	5.530	8	-19.523	5.530	8

$$2\pi \frac{d^2\sigma}{dt d\phi} = \epsilon \frac{d\sigma_L}{dt} + \frac{d\sigma_T}{dt} + \sqrt{2\epsilon(\epsilon + 1)} \frac{d\sigma_{LT}}{dt} \cos\phi + \epsilon \frac{d\sigma_{TT}}{dt} \cos 2\phi$$

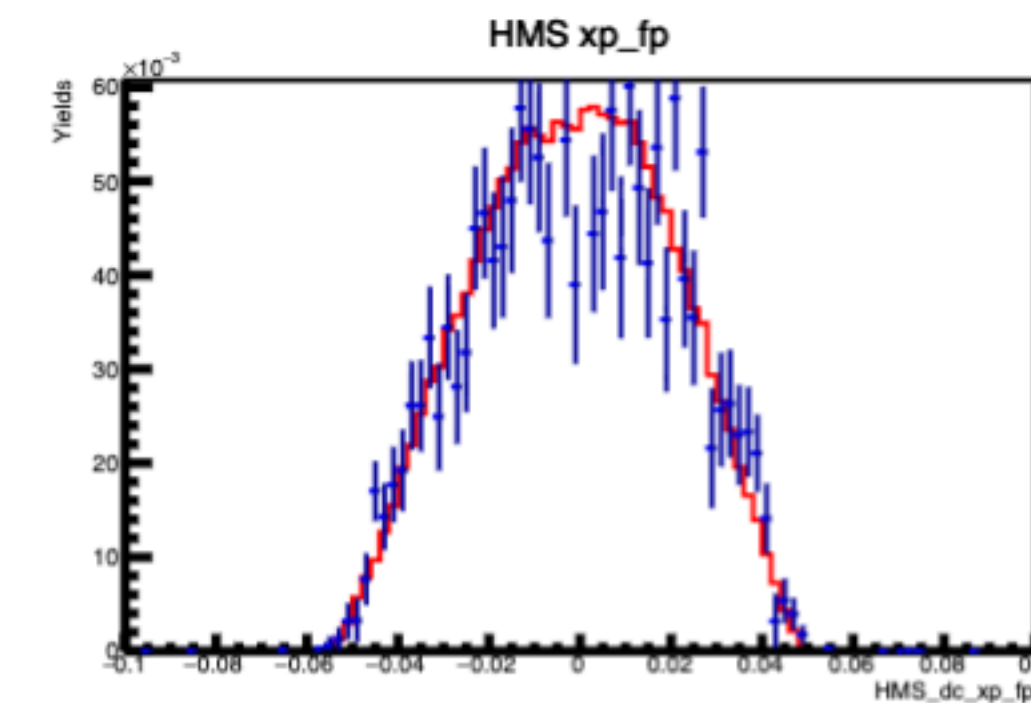
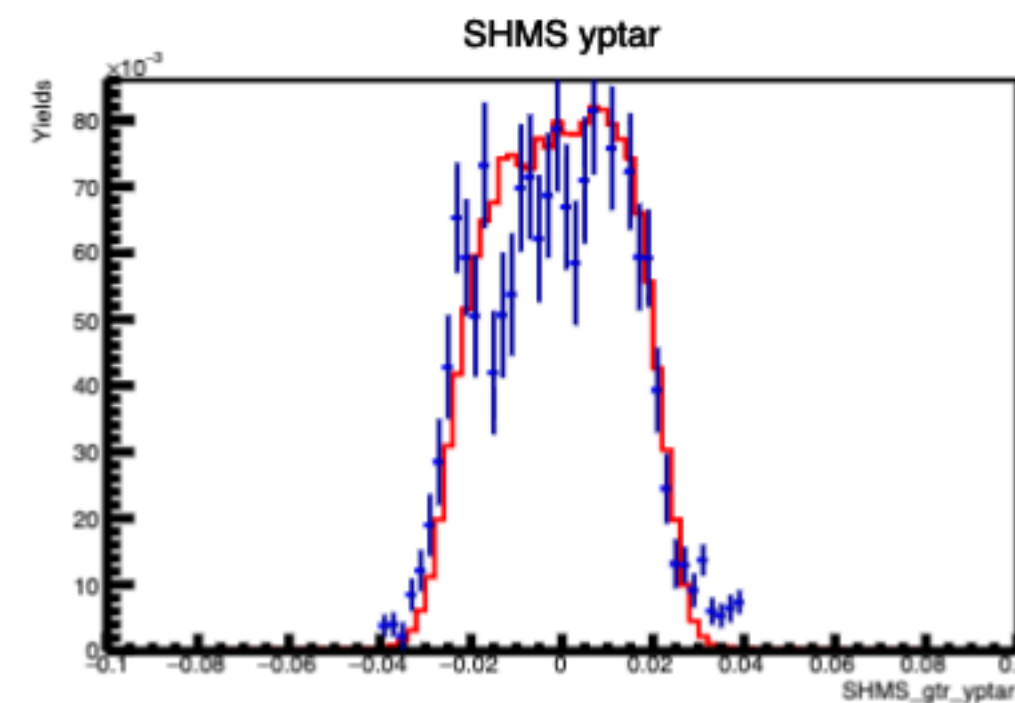
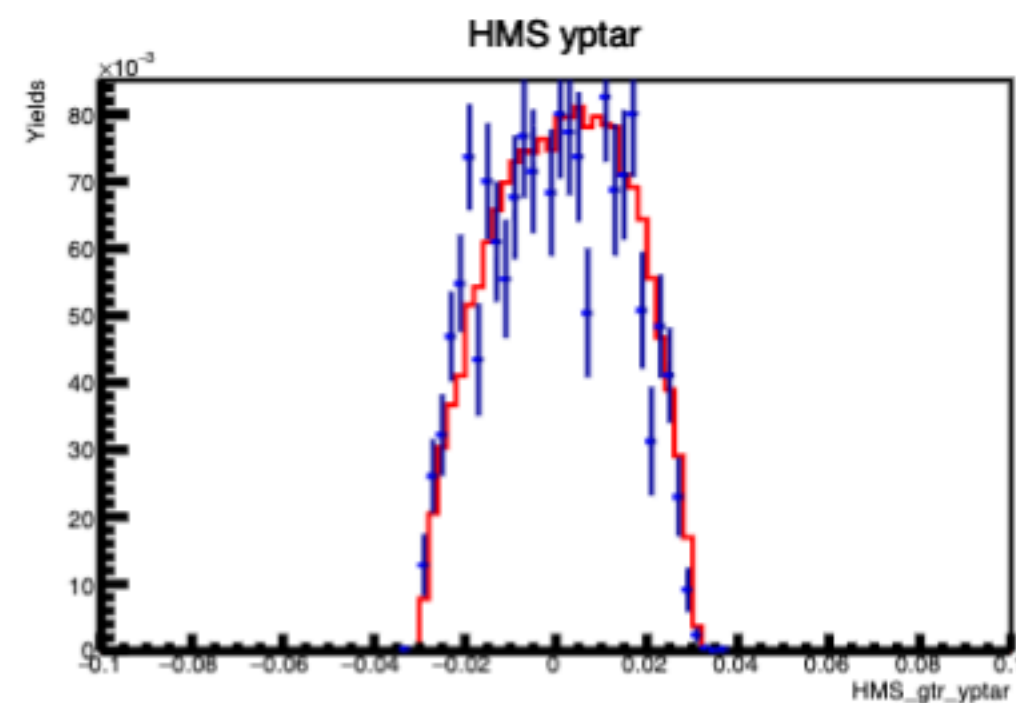
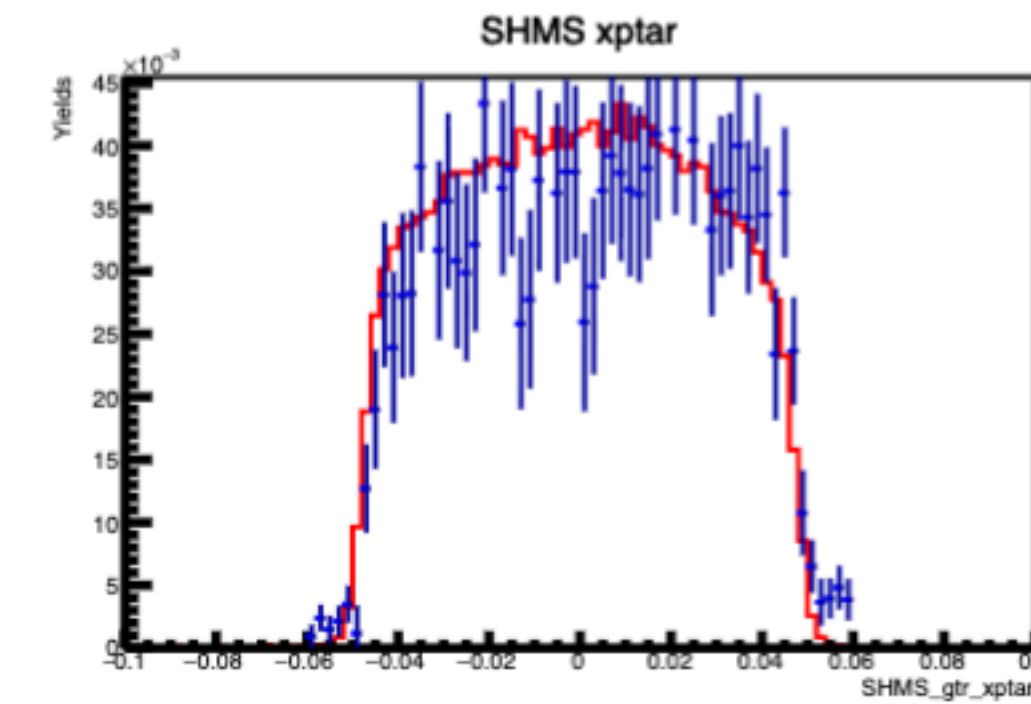
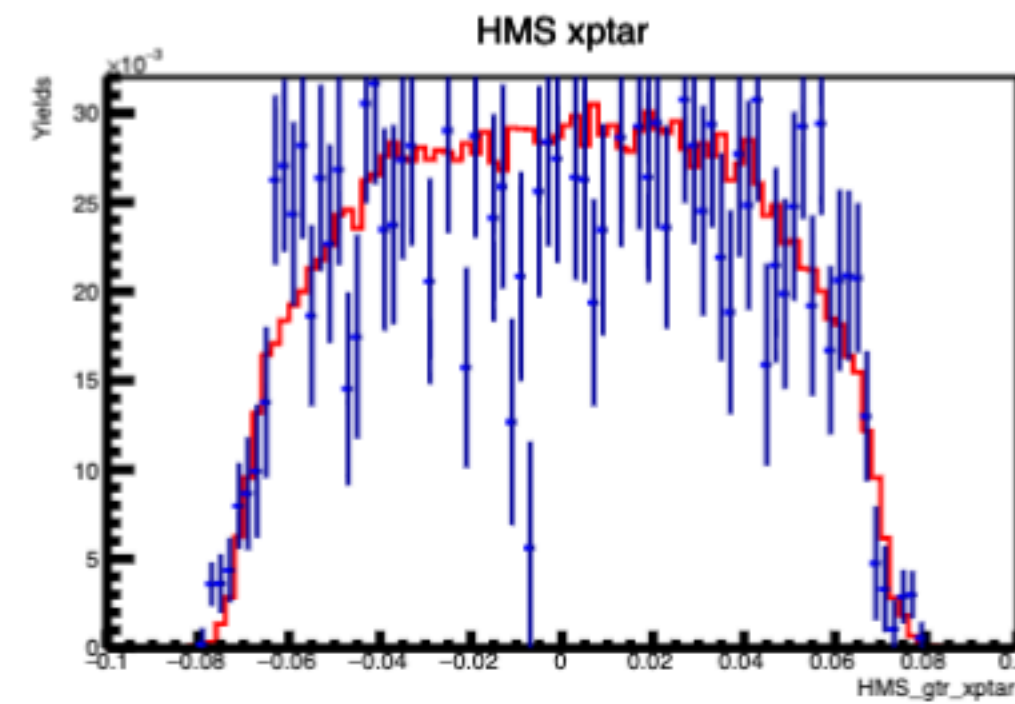
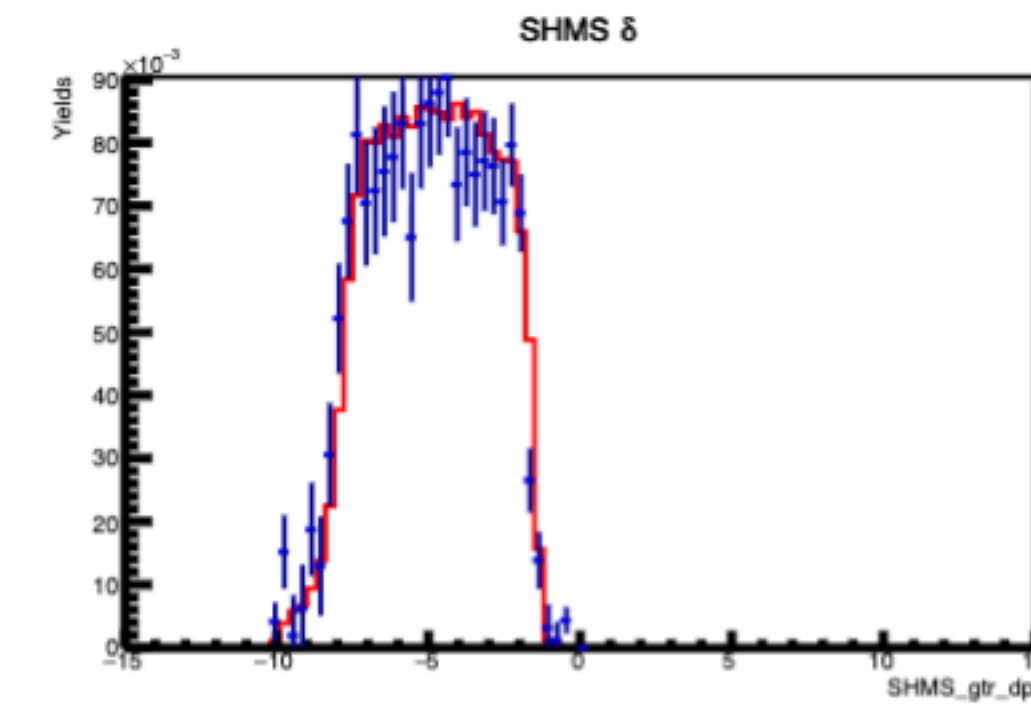
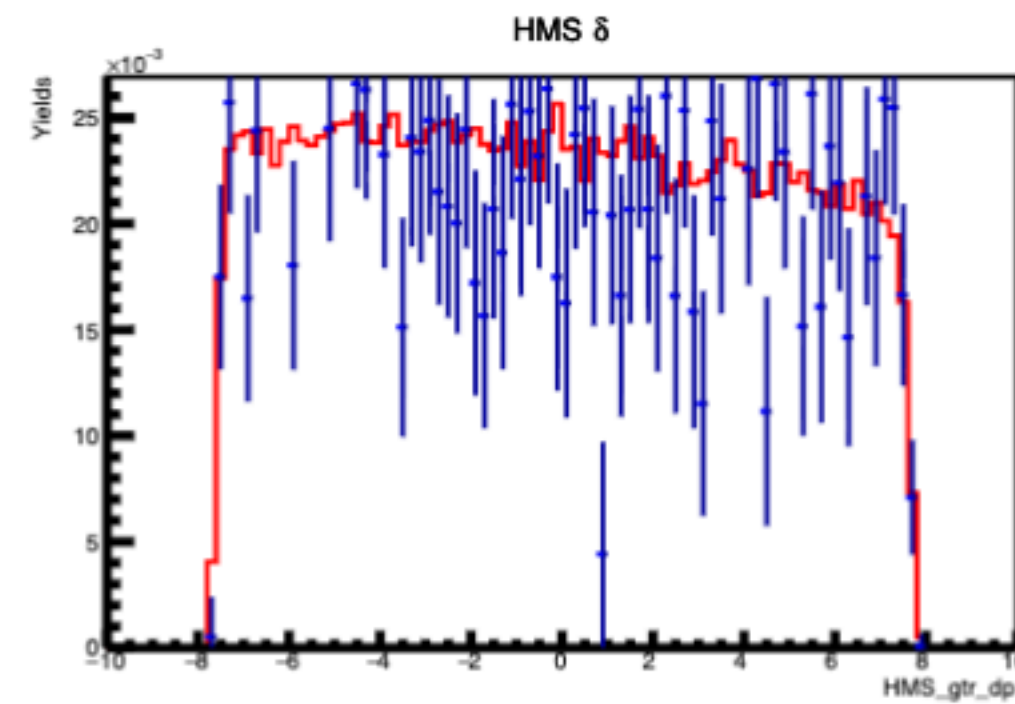


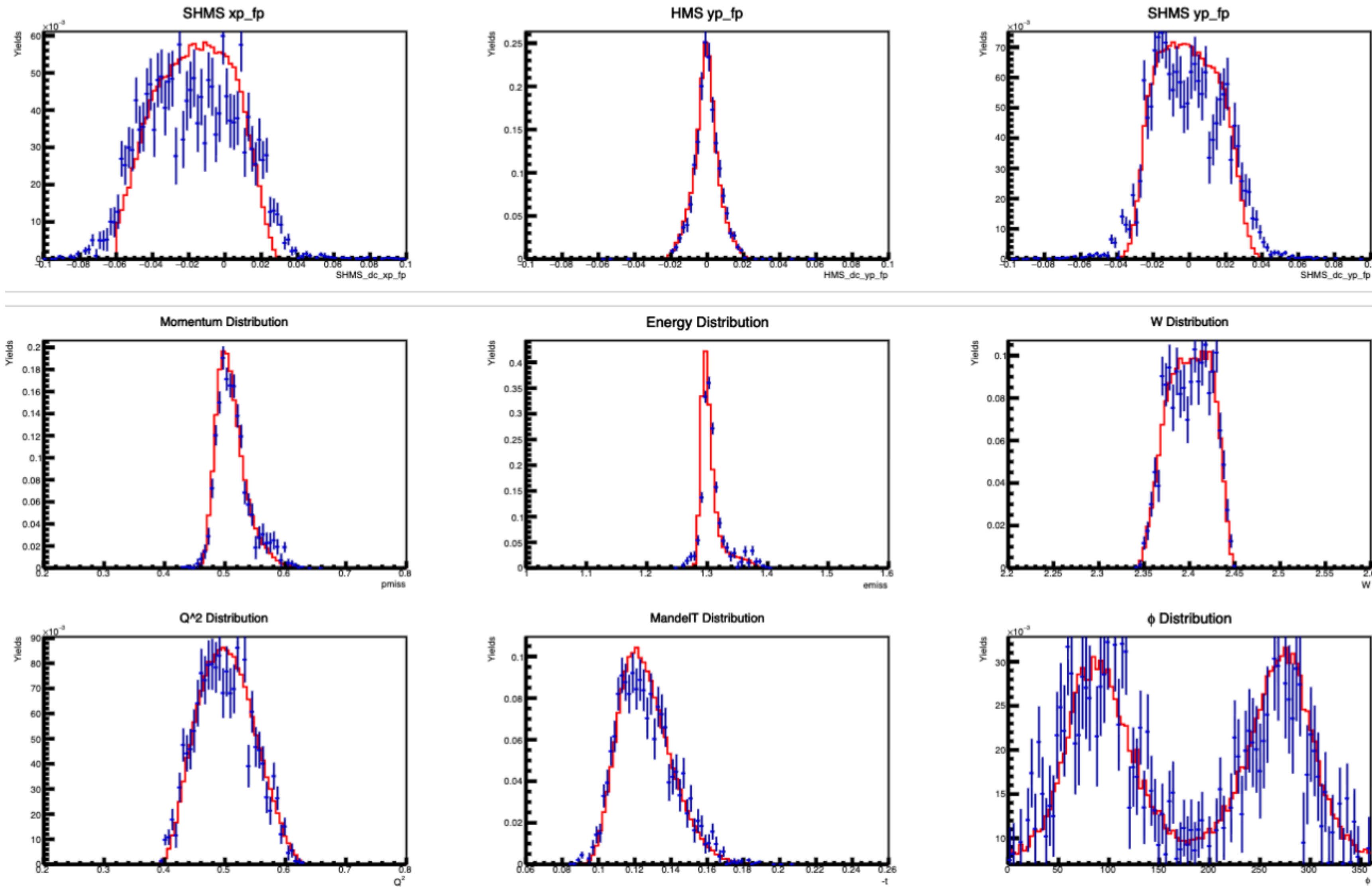






center_lowe
 $\Sigma^0(1193)$
Beam Energy = 3.834 GeV
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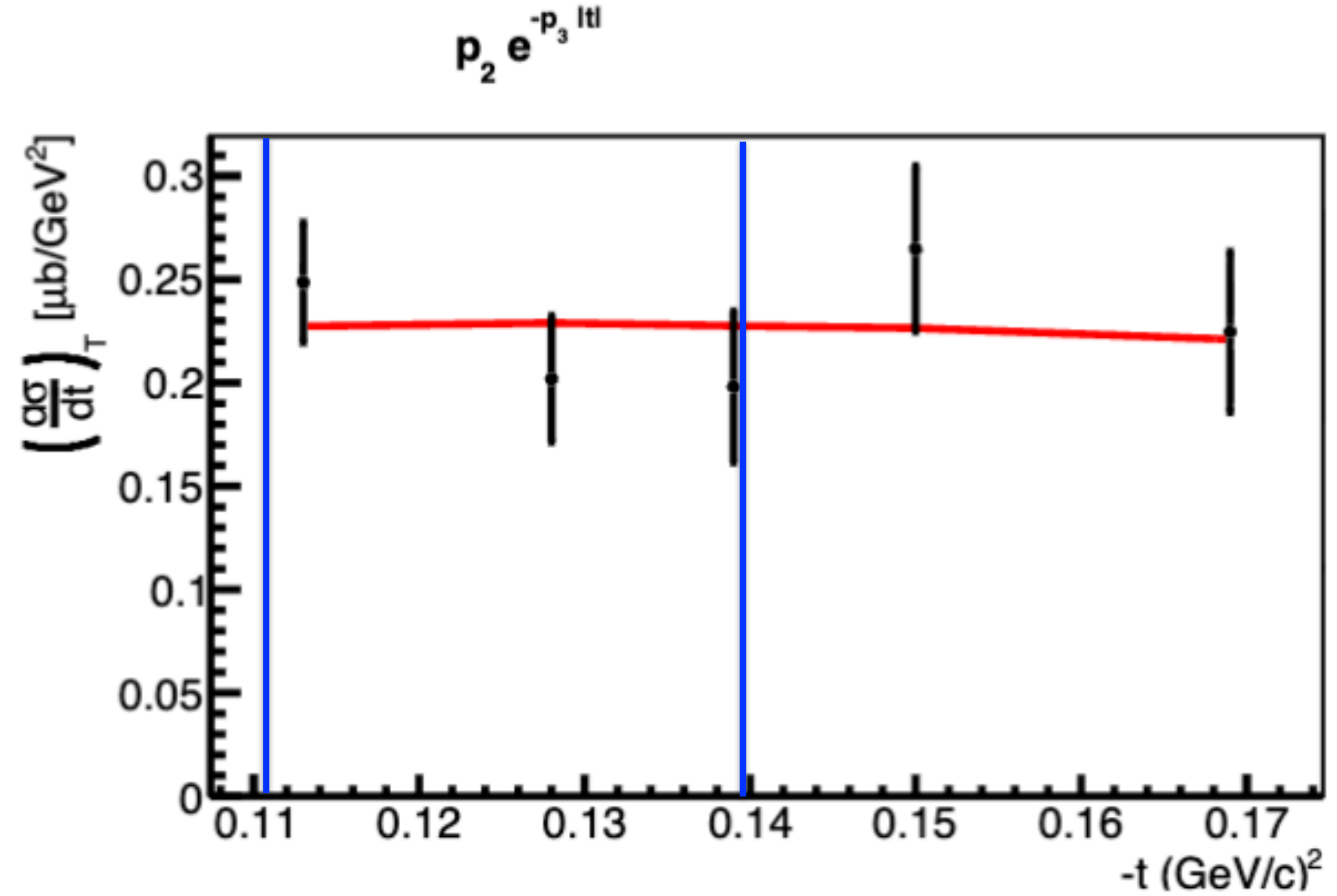
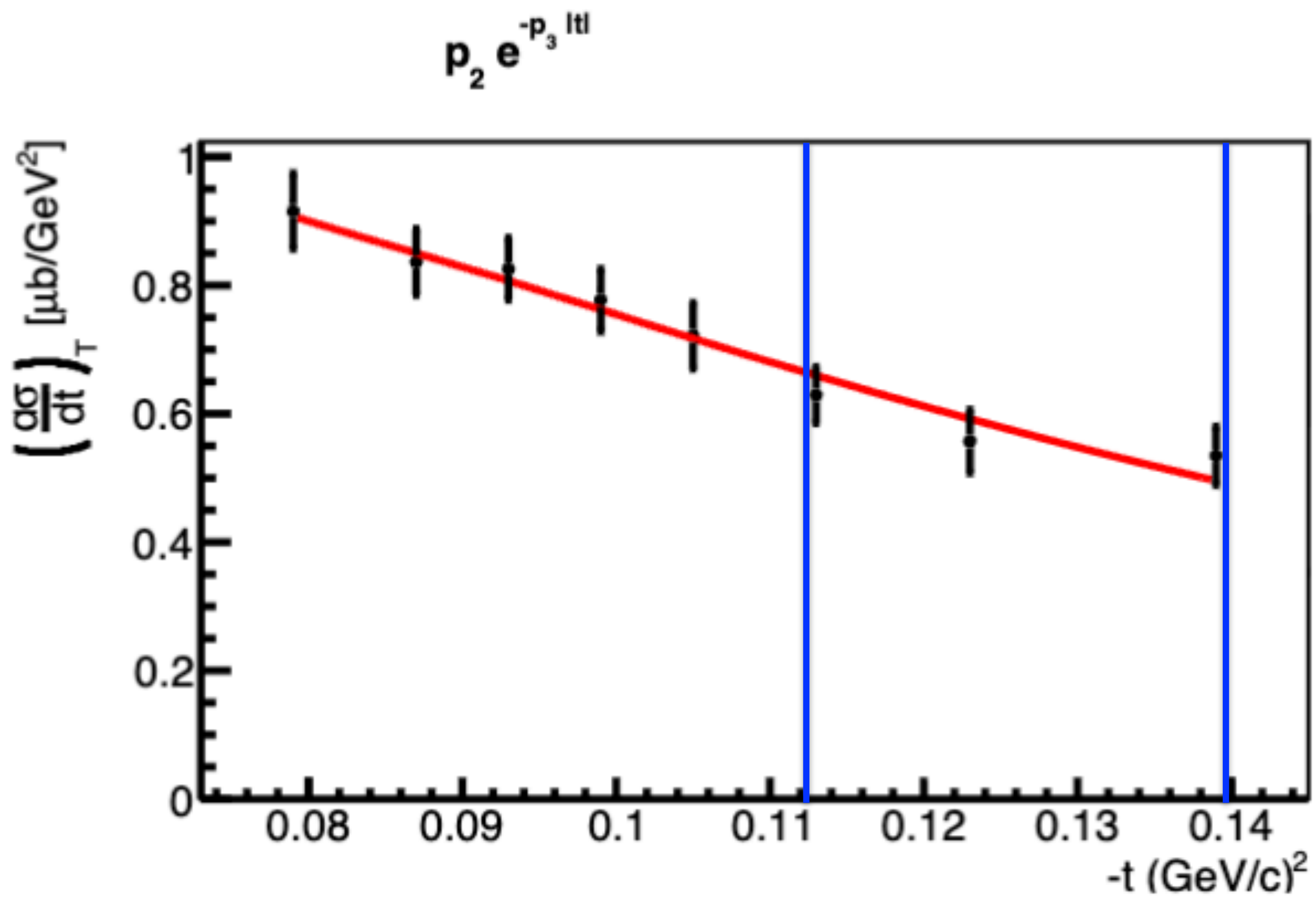


$$\frac{\sigma_T(\gamma^* p \rightarrow K^+ \Sigma^0)}{\sigma_T(\gamma^* p \rightarrow K^+ \Lambda)}$$

Transverse Cross Section Overlap Region

$$p(e, e'K^+)\Lambda$$

$$p(e, e'K^+)\Sigma^0$$



Transverse Cross Section ratio (Σ^0/Λ)

