# KaonLTMeeting

February 22nd, 2024

Richard Trotta

# Overview

1. **Cross Section Model Comparisons**

**$Q^2$=2.115**
**W = 2.95**

p1 = 0.88669E+03
p2 = -0.41000E+03
p3 = -0.25327E+02
p4 = 0.11100E+02
p5 = 0.31423E+02
p6 = -0.18000E+02

$$\sigma_L = (\mathrm{p1} + \mathrm{p2} \cdot \log Q^2) e^{(\mathrm{p3}+\mathrm{p4} \cdot \log Q^2) \cdot |t|}$$
$$\sigma_T = \mathrm{p5} + \mathrm{p6} \cdot \log Q^2$$
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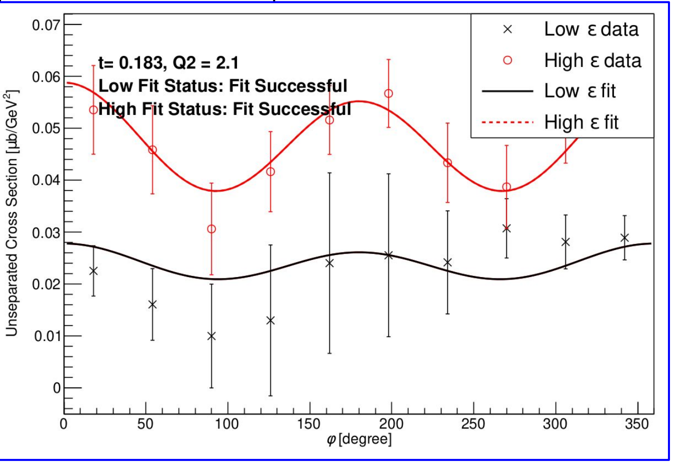


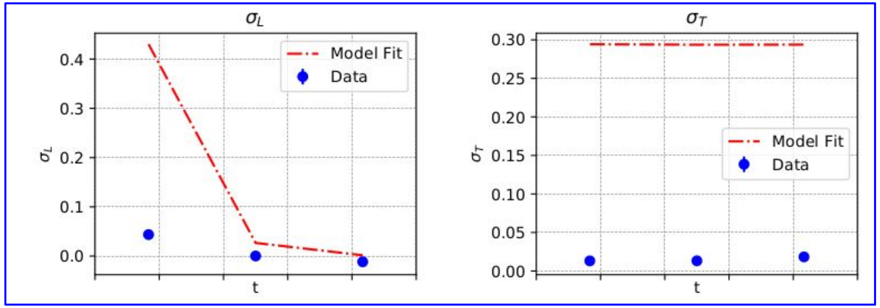


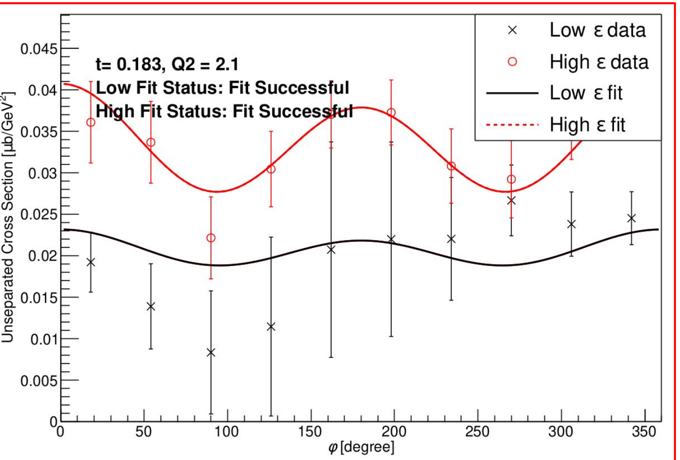


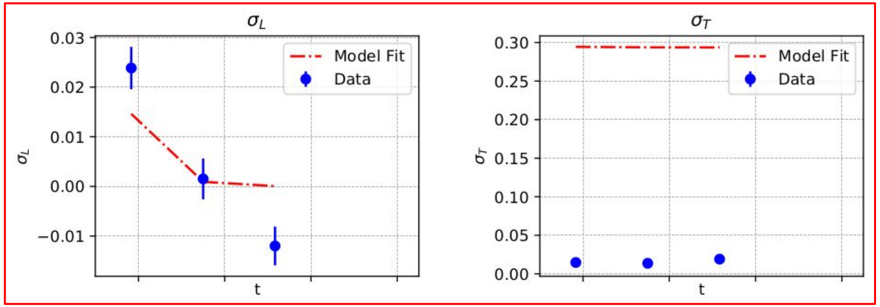

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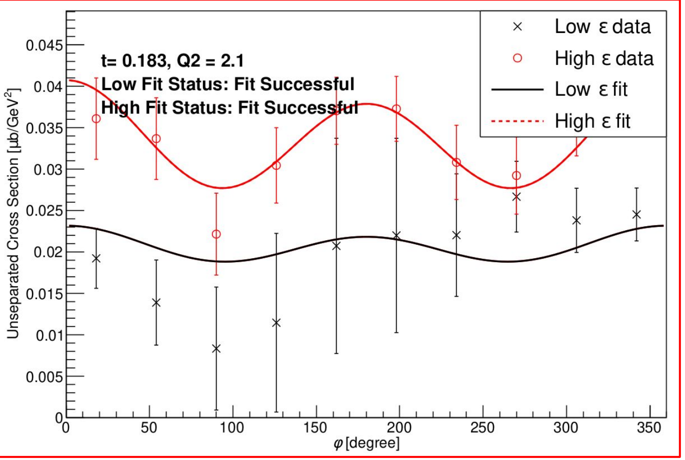
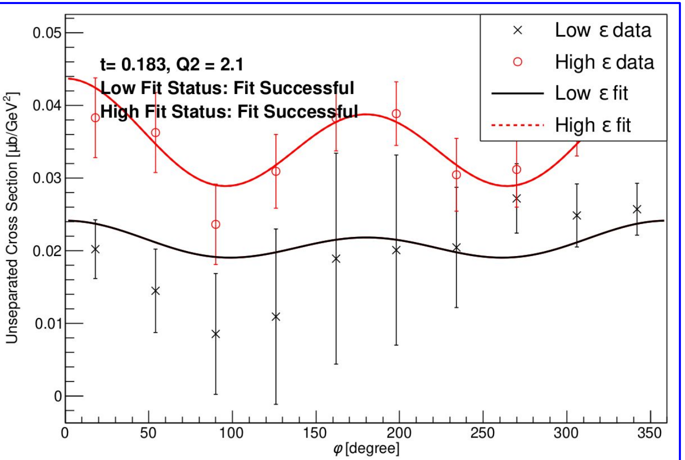
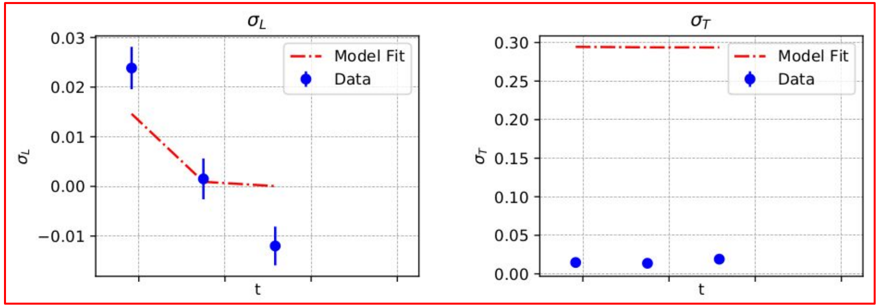
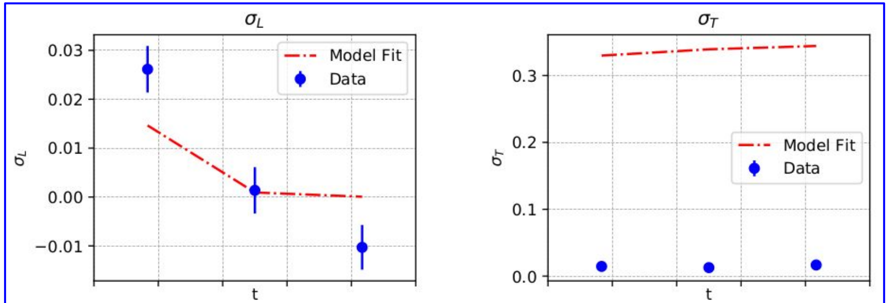


# Updated Model Based off Global Analysis

- sigT seems to be the driver for the biggest discrepancy
- There also seems to be a possible xbj limit for the model where it breaks down (see end slides)
- Checking w_factor and sigT model from paper

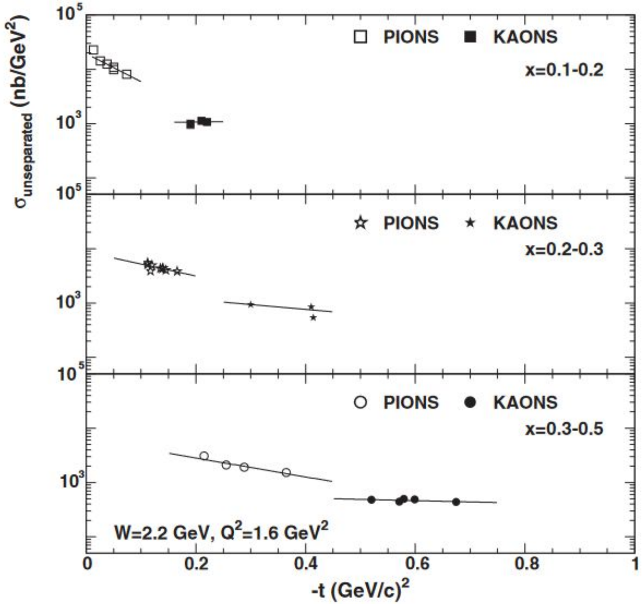
PHYSICAL REVIEW C **85**, 018202 (2012)

**Global analysis of exclusive kaon and pion electroproduction**

T. Horn
*The Catholic University of America, Washington, D.C. 20064, USA*
(Received 15 March 2011; revised manuscript received 14 September 2011; published 30 January 2012)

The $p(e,e'\pi^+)n$ and $p(e,e',K^+)\Lambda$ ($\Sigma^0$) reactions are important tools in the study of hadron structure. In particular, the flavor degree of freedom introduced with the addition of the strange quark helps us understand the reaction mechanism underlying strangeness production, and the transition from hadronic to partonic degrees of freedom in exclusive processes. In this study, we examine the world's data on exclusive $p(e,e'\pi^+)n$ and $p(e,e'K^+)\Lambda$ cross sections. The data were combined into a superset with one global uncertainty, and examined for $-t$ dependence of the longitudinal and transverse components of the cross section as function of $Q^2$ and the longitudinal momentum fraction, $x_B$. The data suggest that the importance of $t$-channel meson exchange decreases at higher values of $x_B$. The $Q^2$ dependence of the longitudinal to transverse cross section ratio was compared with the $Q^2$-scaling expectation for hard exclusive processes.

DOI: 10.1103/PhysRevC.85.018202 PACS number(s): 14.40.−n, 11.55.Jy, 13.40.Gp, 25.30.Rw



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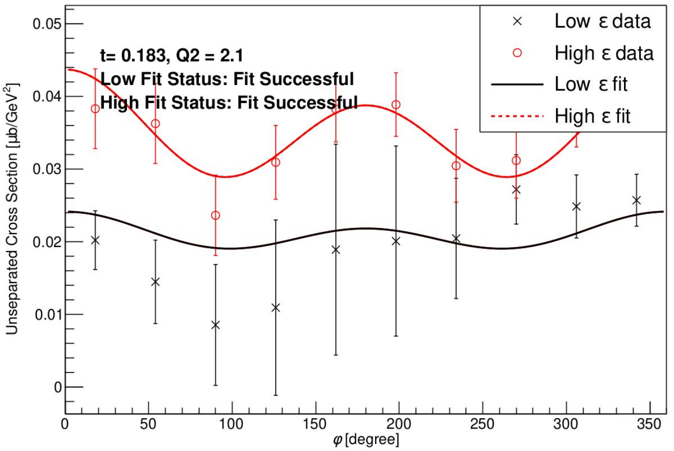


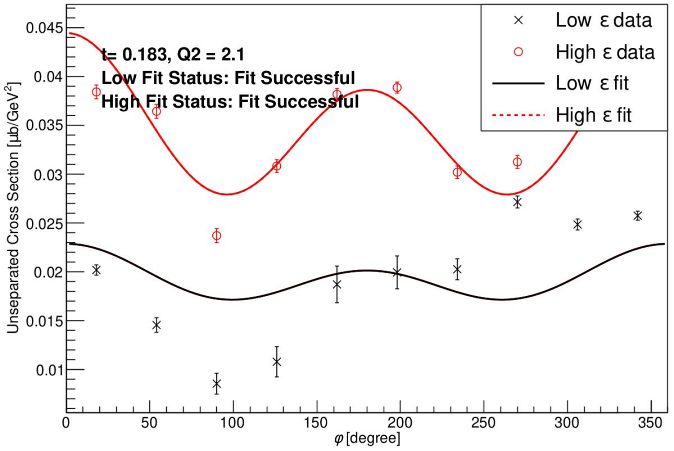


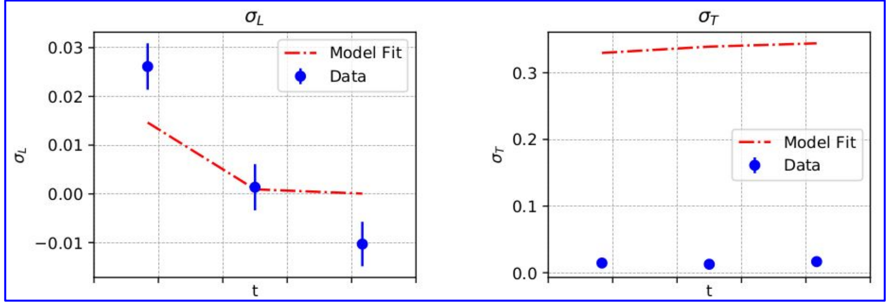


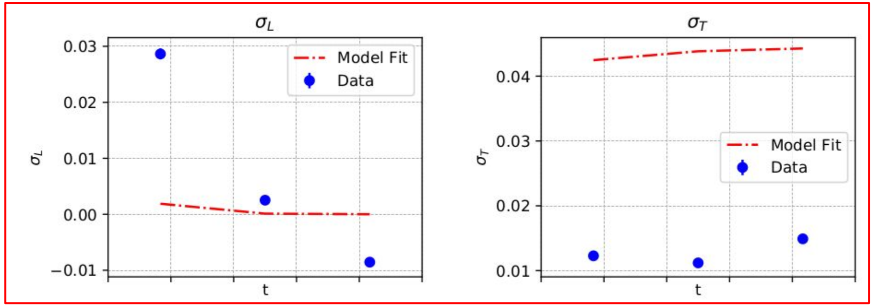

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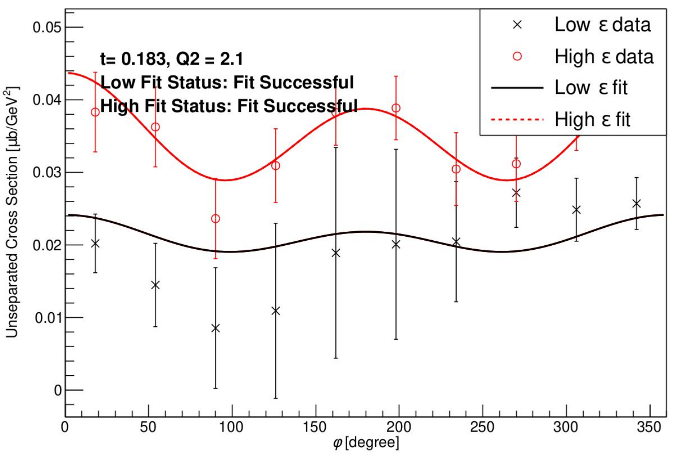


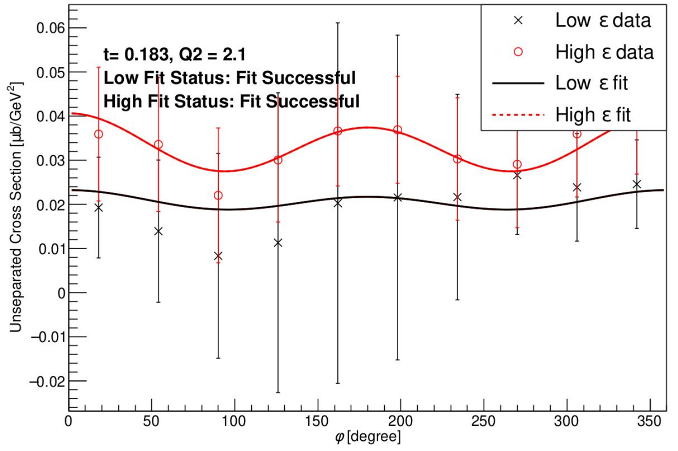


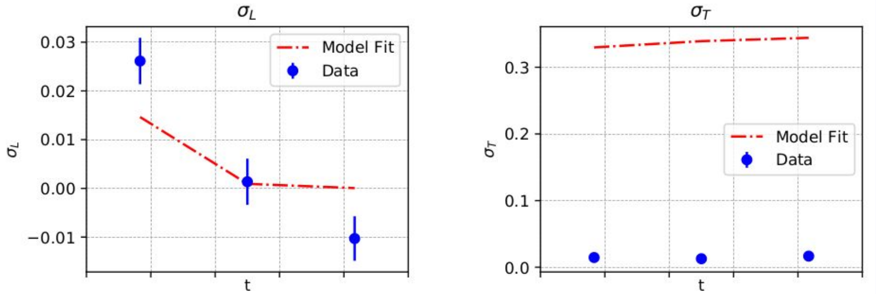


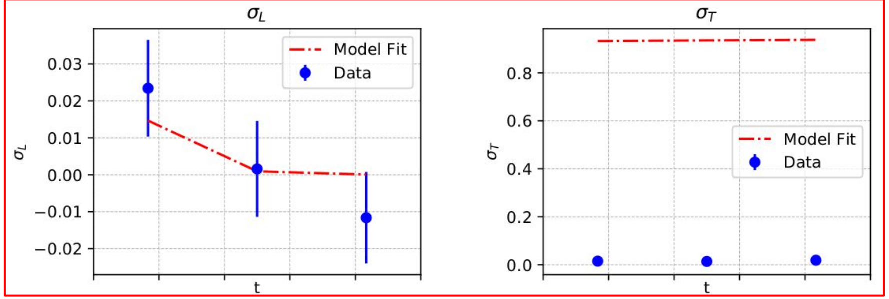

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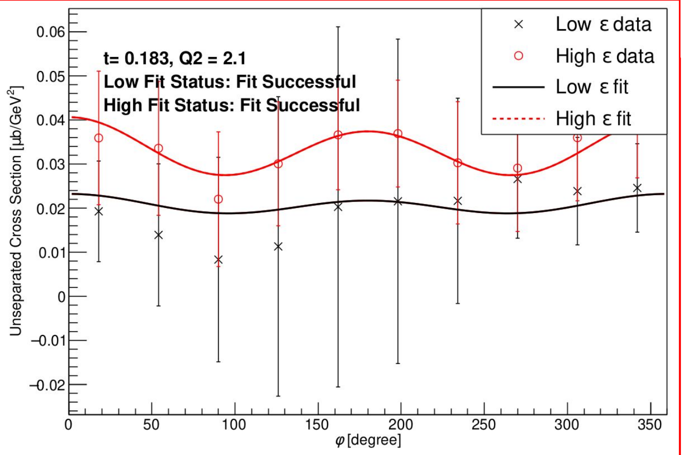


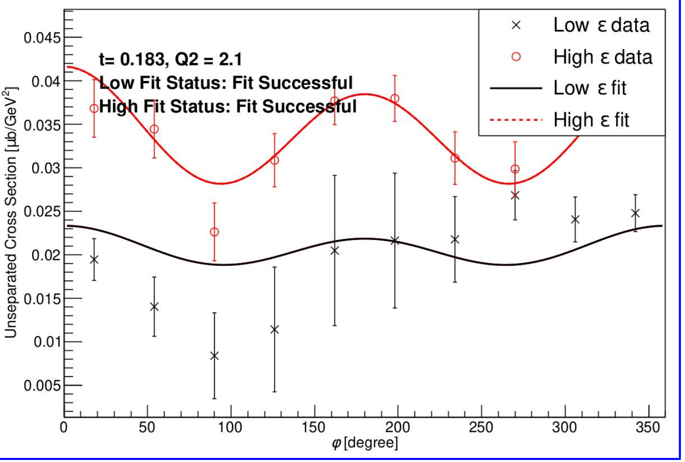


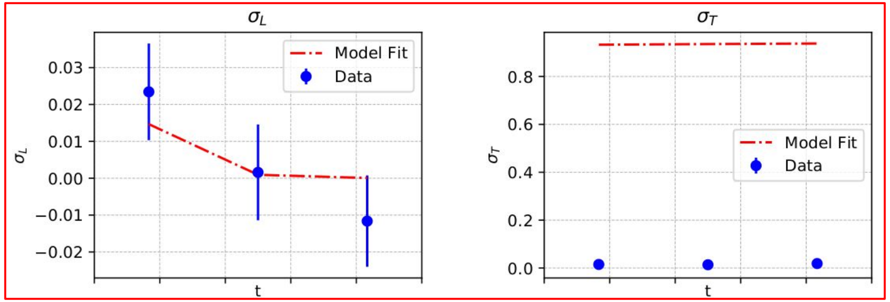


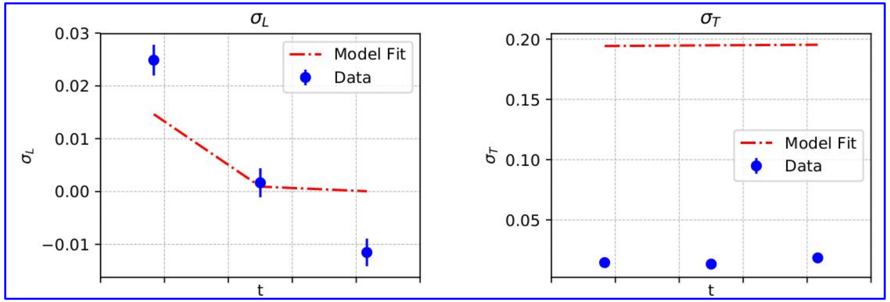

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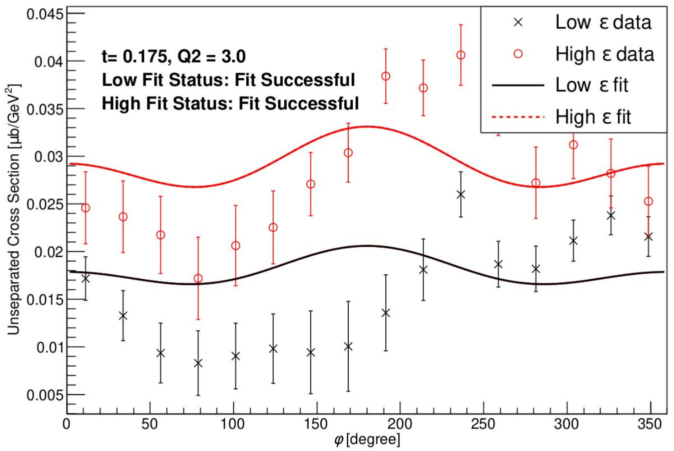


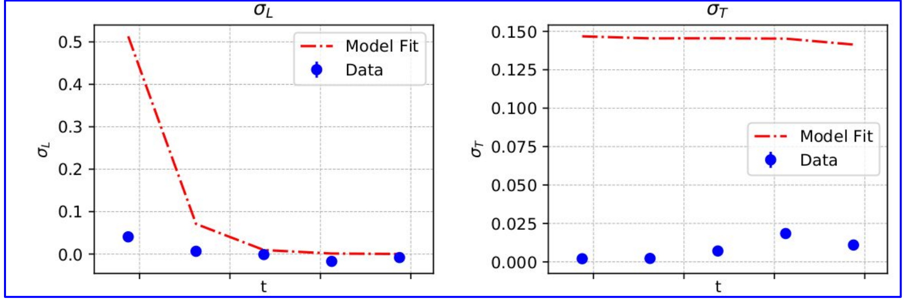


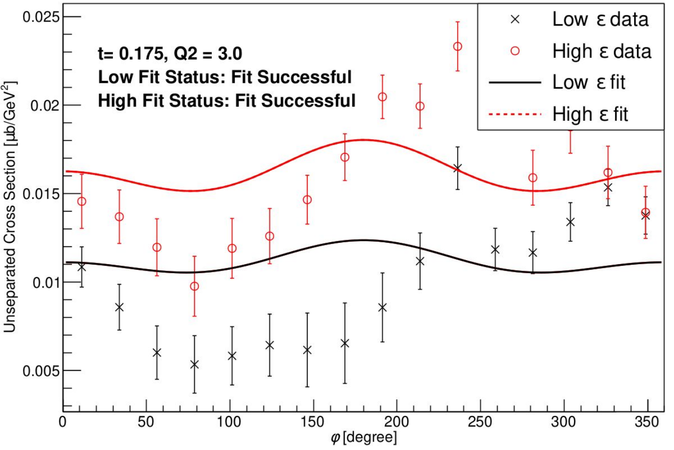


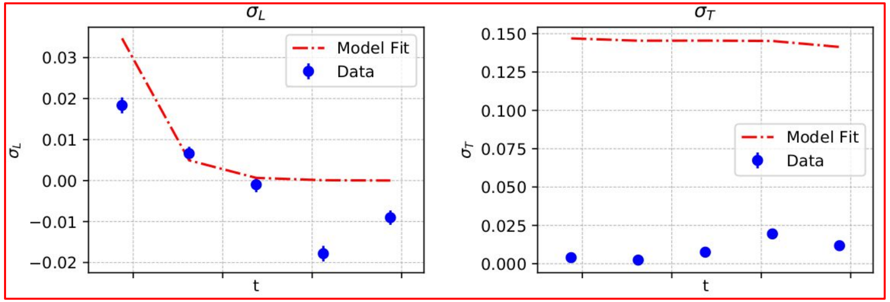

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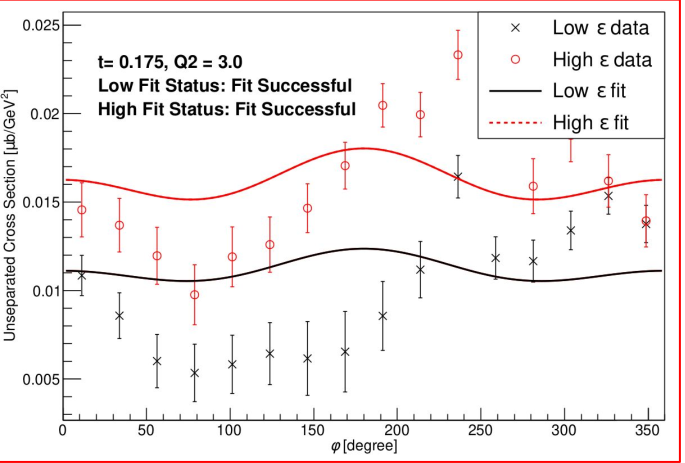


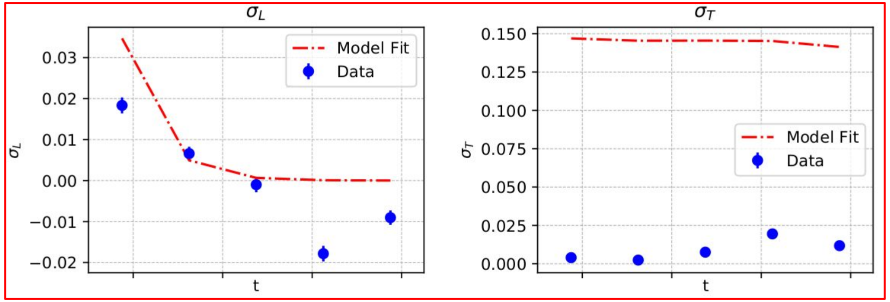


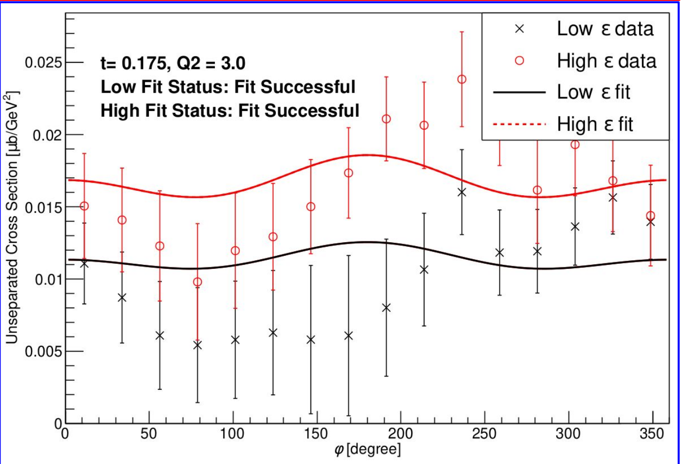


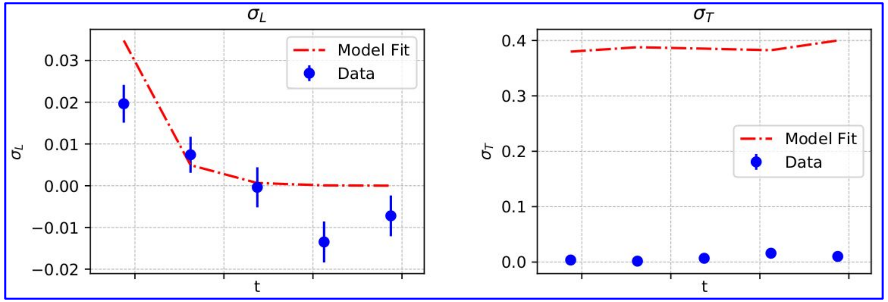

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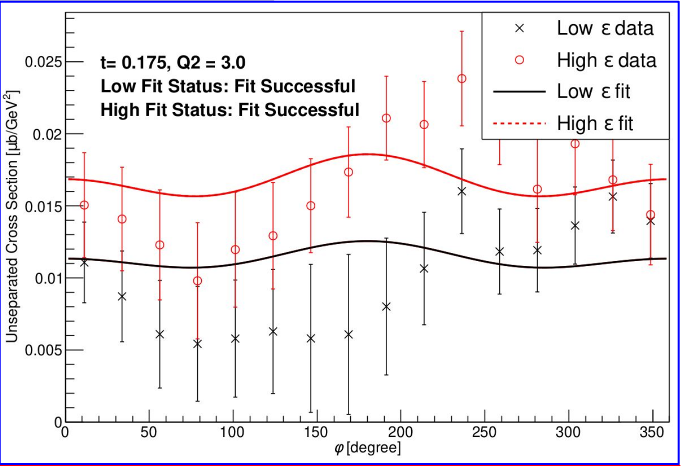


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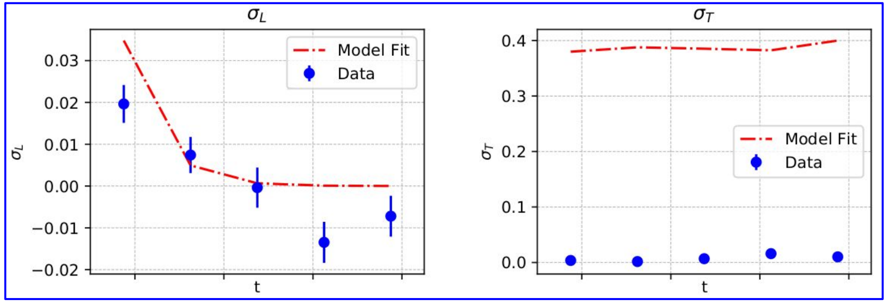


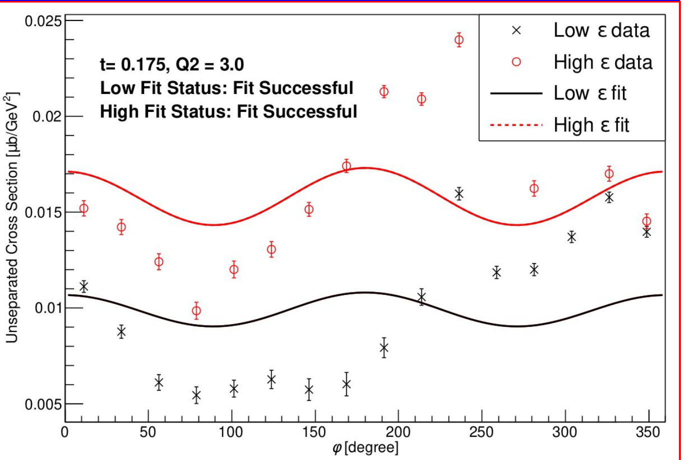


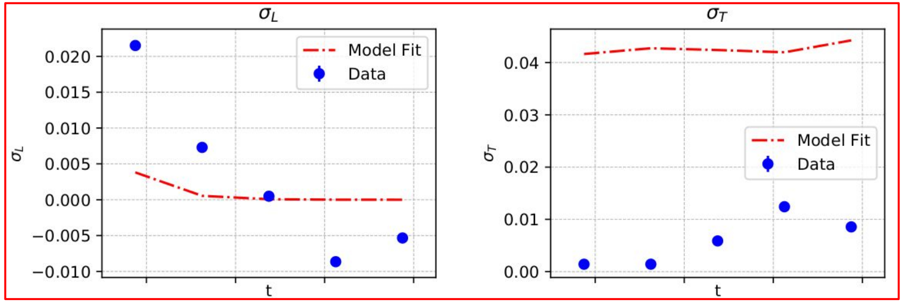

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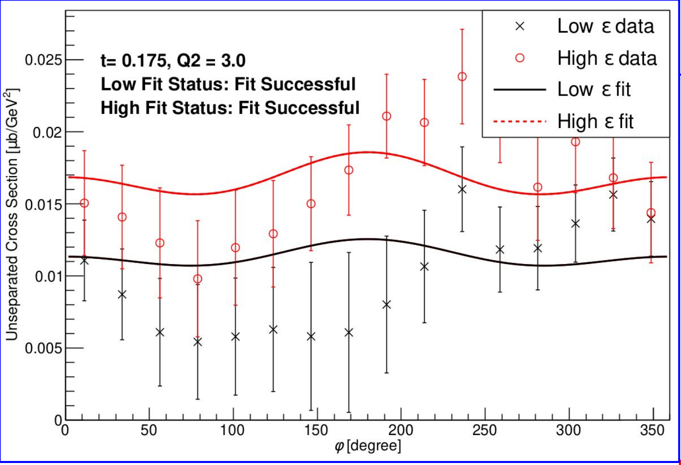


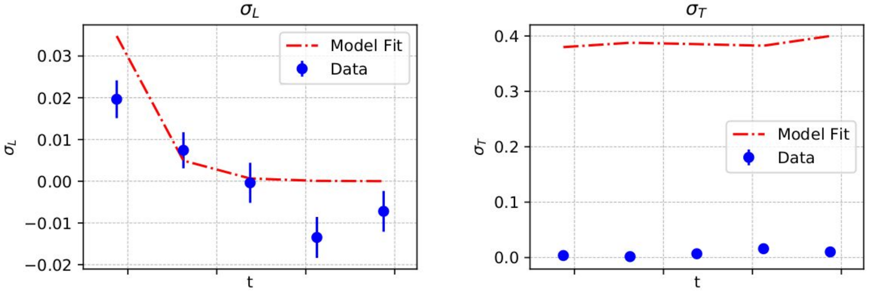


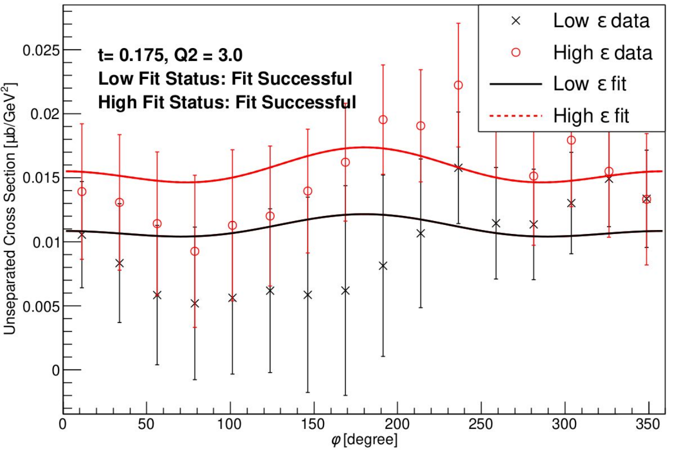


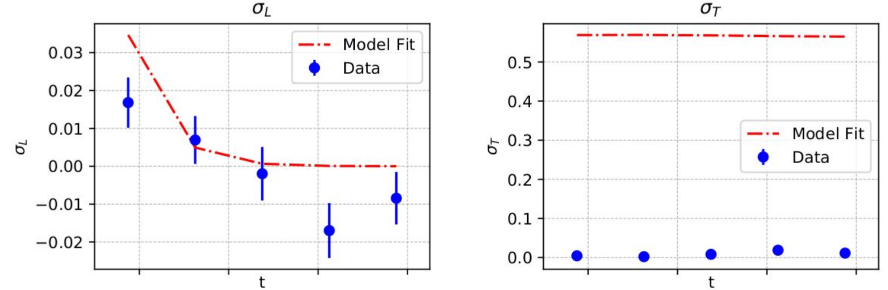

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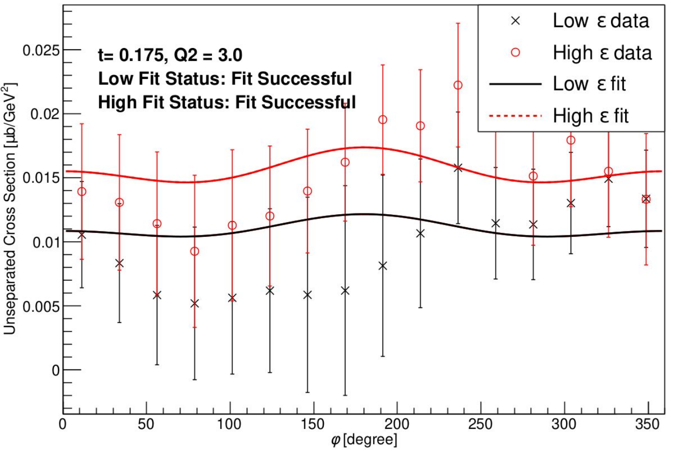


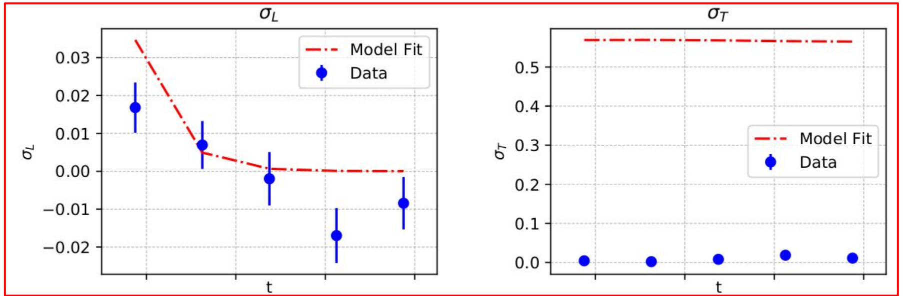


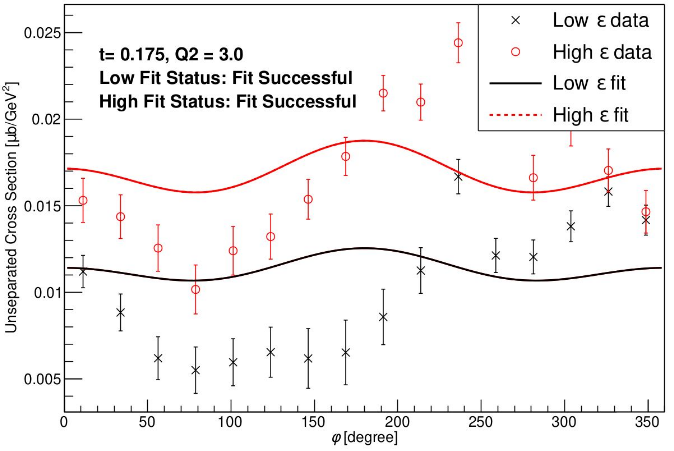


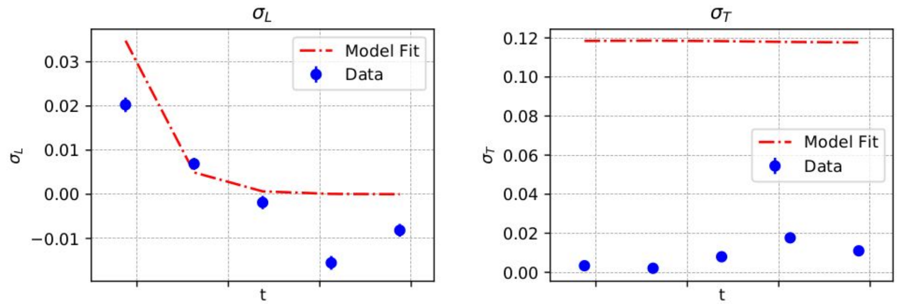

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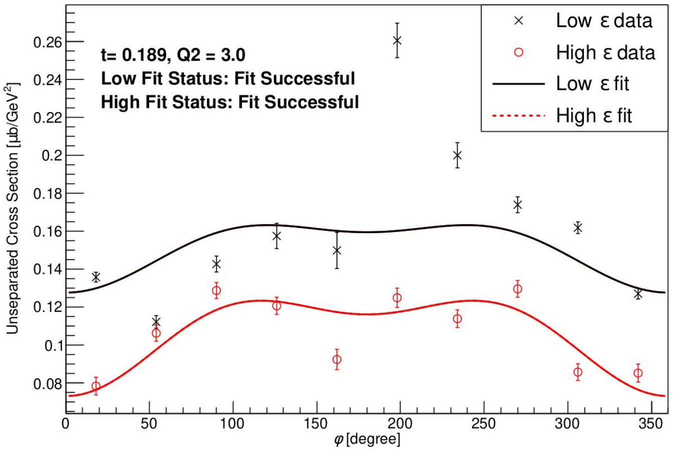
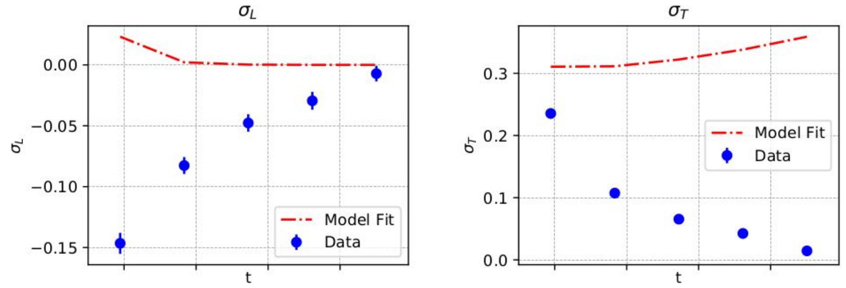
p5 = 0.31423E+02
p6 = -0.18000E+02




$$\sigma_L = (\mathrm{p1} + \mathrm{p2} \cdot \log Q^2) e^{(\mathrm{p3}+\mathrm{p4}\cdot\log Q^2)\cdot(|t|+0.2)}$$

$$\sigma_T = \mathrm{p5} \cdot \log \mathrm{Q}^2 + \frac{\mathrm{p6}}{(Q^2)^2}$$

$$\mathrm{wfactor} = \frac{1}{(W^2 - M_p^2)^3}$$



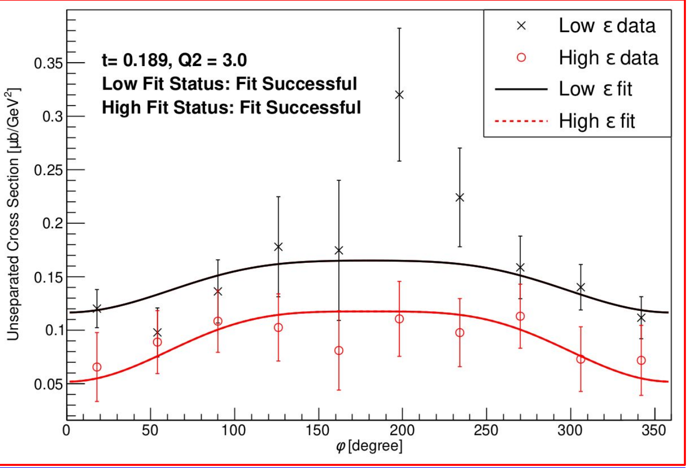
**$Q^2$=3.0**
**W = 2.32**

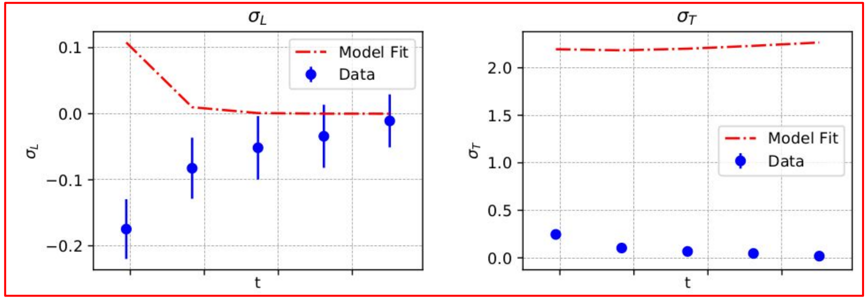
$$\sigma_L = (\mathrm{p1} + \mathrm{p2}\cdot\log Q^2)e^{(\mathrm{p3}+\mathrm{p4}\cdot\log Q^2)\cdot(|t|+0.2)}$$

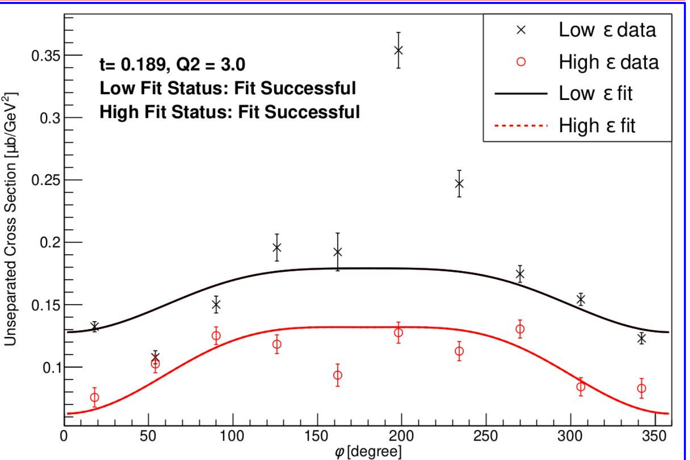
$$\sigma_T = \frac{\mathrm{p5}}{1+\mathrm{p6}\cdot Q^2}$$

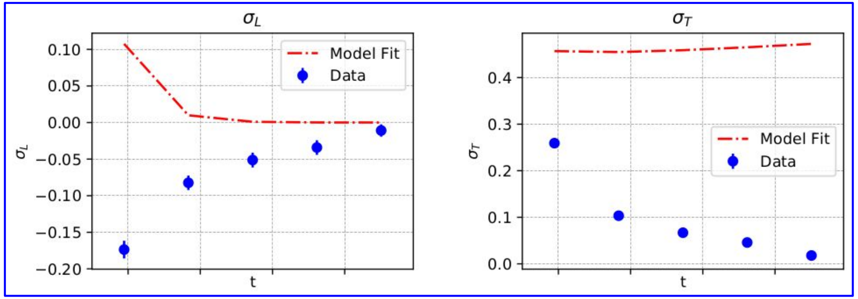
$$\mathrm{wfactor} = \frac{1}{(W^2 - M_p^2)^2}$$

| | |
|---|---|
| p1 = 0.88669E+03 | p1 = 0.88669E+03 |
| p2 = -0.41000E+03 | p2 = -0.41000E+03 |
| p3 = -0.25327E+02 | p3 = -0.25327E+02 |
| p4 = 0.11100E+02 | p4 = 0.11100E+02 |
| p5 = 1.20000+02 | p5 = 2.50000+01 |
| p6 = 0.53000E+00 | p6 = 0.53000E+00 |



**$Q^2$= 4.4**
**W = 2.74**

****** HAVE NOT CHECKED PID, etc.**

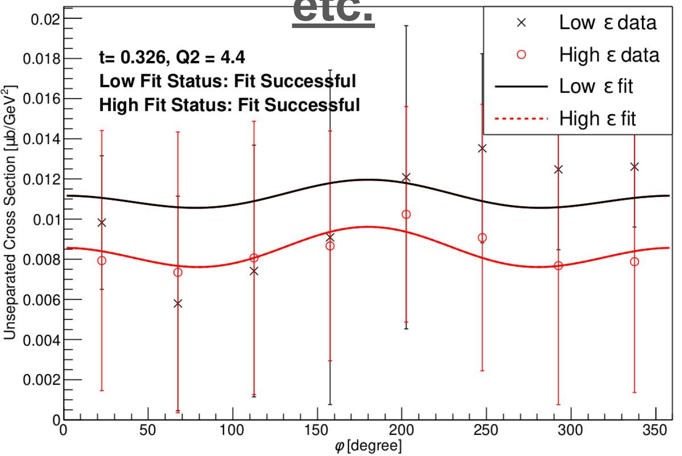
$$\sigma_L = (\mathrm{p1} + \mathrm{p2} \cdot \log Q^2) e^{(\mathrm{p3} + \mathrm{p4} \cdot \log Q^2) \cdot (|t| + 0.2)}$$

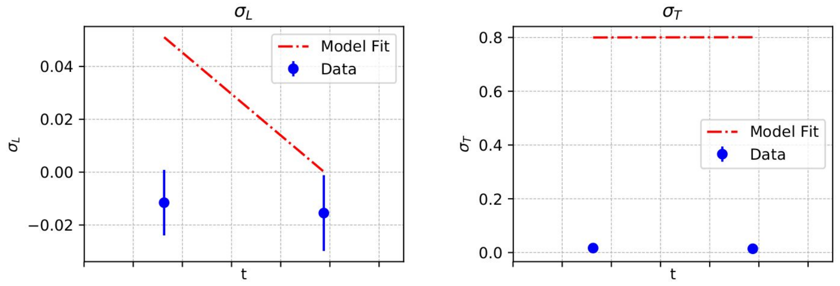
$$\sigma_T = \frac{\mathrm{p5}}{1 + \mathrm{p6} \cdot Q^2}$$

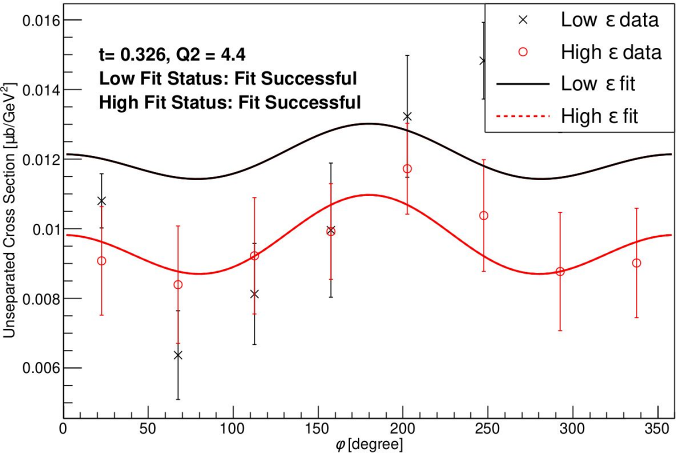
$$\mathrm{wfactor} = \frac{1}{(W^2 - M_p^2)^2}$$

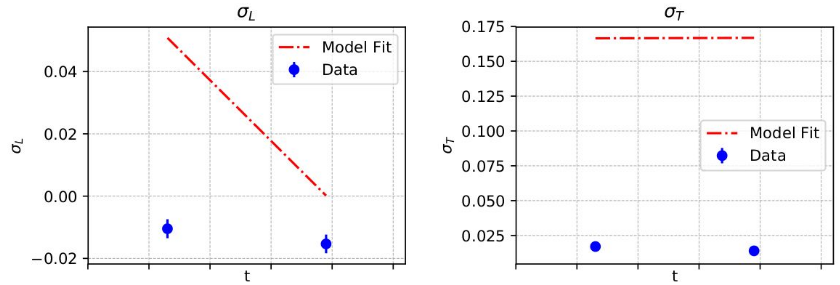
p1 = 0.88669E+03
p2 = -0.41000E+03
p3 = -0.25327E+02
p4 = 0.11100E+02
p5 = 1.20000+02
p6 = 0.53000E+00

p1 = 0.88669E+03
p2 = -0.41000E+03
p3 = -0.25327E+02
p4 = 0.11100E+02
p5 = 2.50000+01
p6 = 0.53000E+00



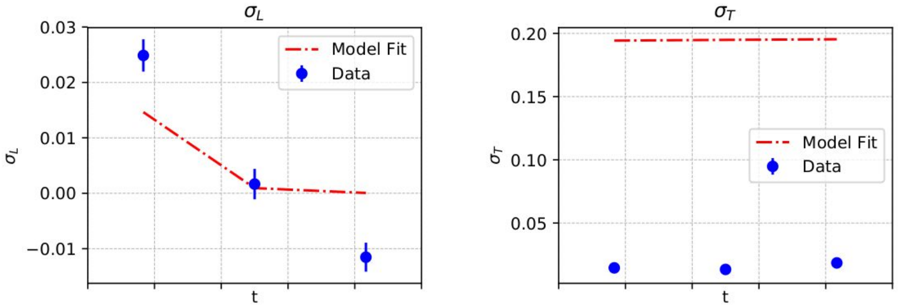



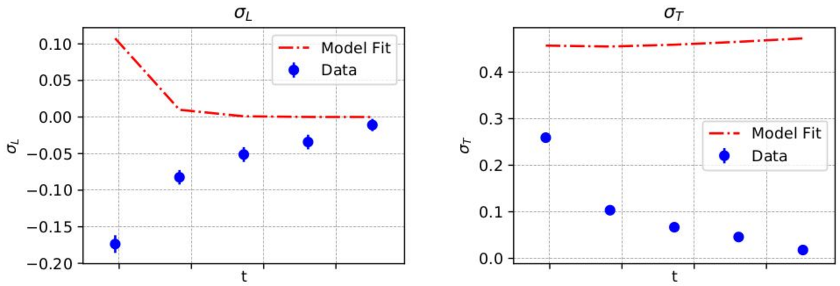



# Updated Model Based off Global Analysis

## Q2=2.1, W=2.95, xlo=0.25

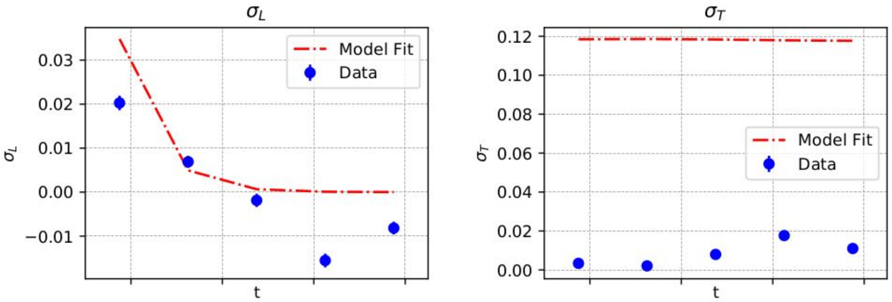



## Q2=3.0, W=2.32, xlo=0.57




****** HAVE NOT CHECKED PID, etc.**

## Q2=3.0, W=3.14, xlo=0.39




## Q2=4.4, W=2.74, xlo=0.48