

Pion-LT/Kaon-LT Collaboration Meeting

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LTSep Analysis

❑ Next steps are listed as follows:

- Unseparated cross-section calculations
- Model iterations
- Rosenbluth equation fitting
- L/T separated cross-section calculations
- Pion Form Factor measurements

New Model Functions

LTsep Functions

❑ Started with functional forms:

$$\frac{d\sigma_T}{dt} = \frac{p1}{Q^2} + \frac{p2}{Q^4}$$

$$\frac{d\sigma_L}{dt} = (p5 + p6/Q^2) \cdot \frac{|t|}{(|t| + m_\pi^2)^2} \cdot Q^2 e^{(p7|t|)} F_\pi^2$$

Where, $F_\pi = \frac{1}{(1 + p8 \cdot Q^2 + p9 \cdot Q^4)^2}$

$$\frac{d\sigma_{LT}}{dt} = \left(e^{p10 + \frac{p11}{\sqrt{Q^2}} \cdot |t|} + p12 + \frac{p13}{Q^4} \right) \cdot \sin(\theta^*)$$

$$\frac{d\sigma_{TT}}{dt} = \frac{p14}{Q^4} \cdot \frac{|t|}{(|t| + m_\pi^2)^2} \cdot \sin(\theta^*)^2$$

Set σ_{LT} and σ_{TT} to zero. σ_T fixed.
In σ_L , fixed p7, p8 and p9

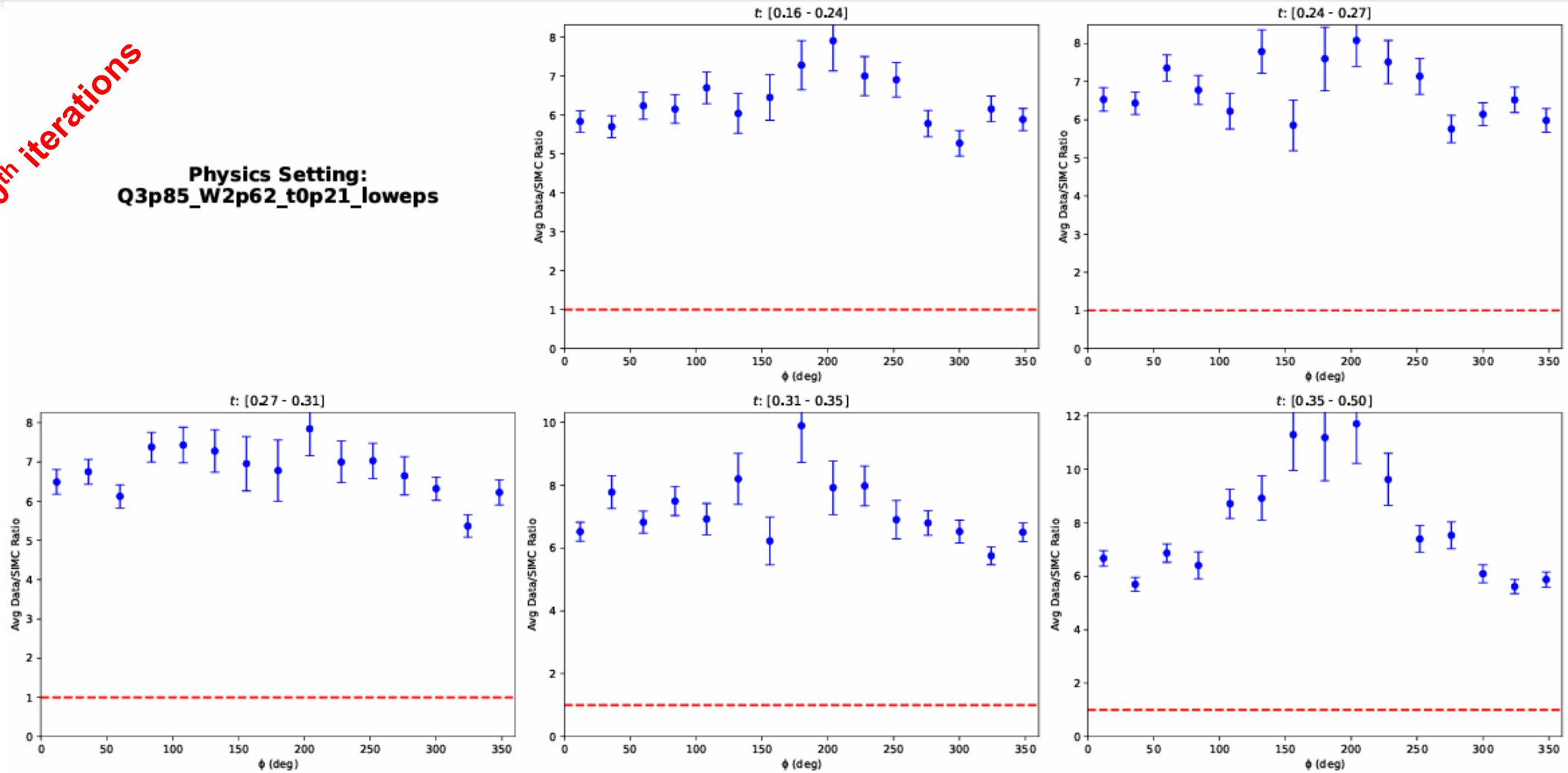
Parameter	Initial Values (Fpi2)
p1	3.9
p2	5.8
p5	37.08
p6	-6.35
p7	-4.11
P8	1.6
P9	-0.015
p10	-10000
p11	0.0
p12	0.0
p13	0.0
p14	0.0

Iteration 00

Physics Ratios

0th iterations

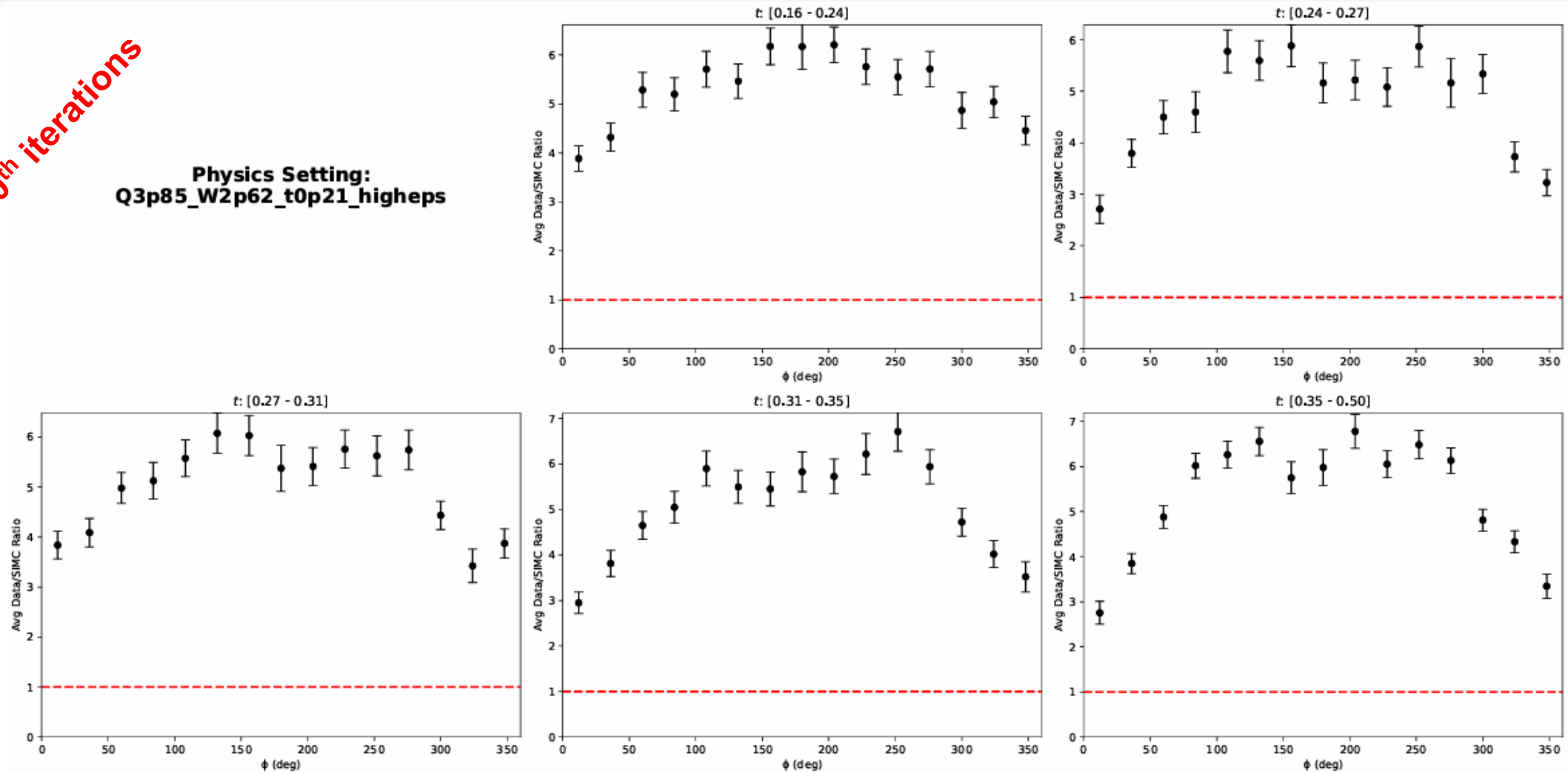
Physics Setting:
Q3p85_W2p62_t0p21_loweps



Physics Ratios

0th iterations

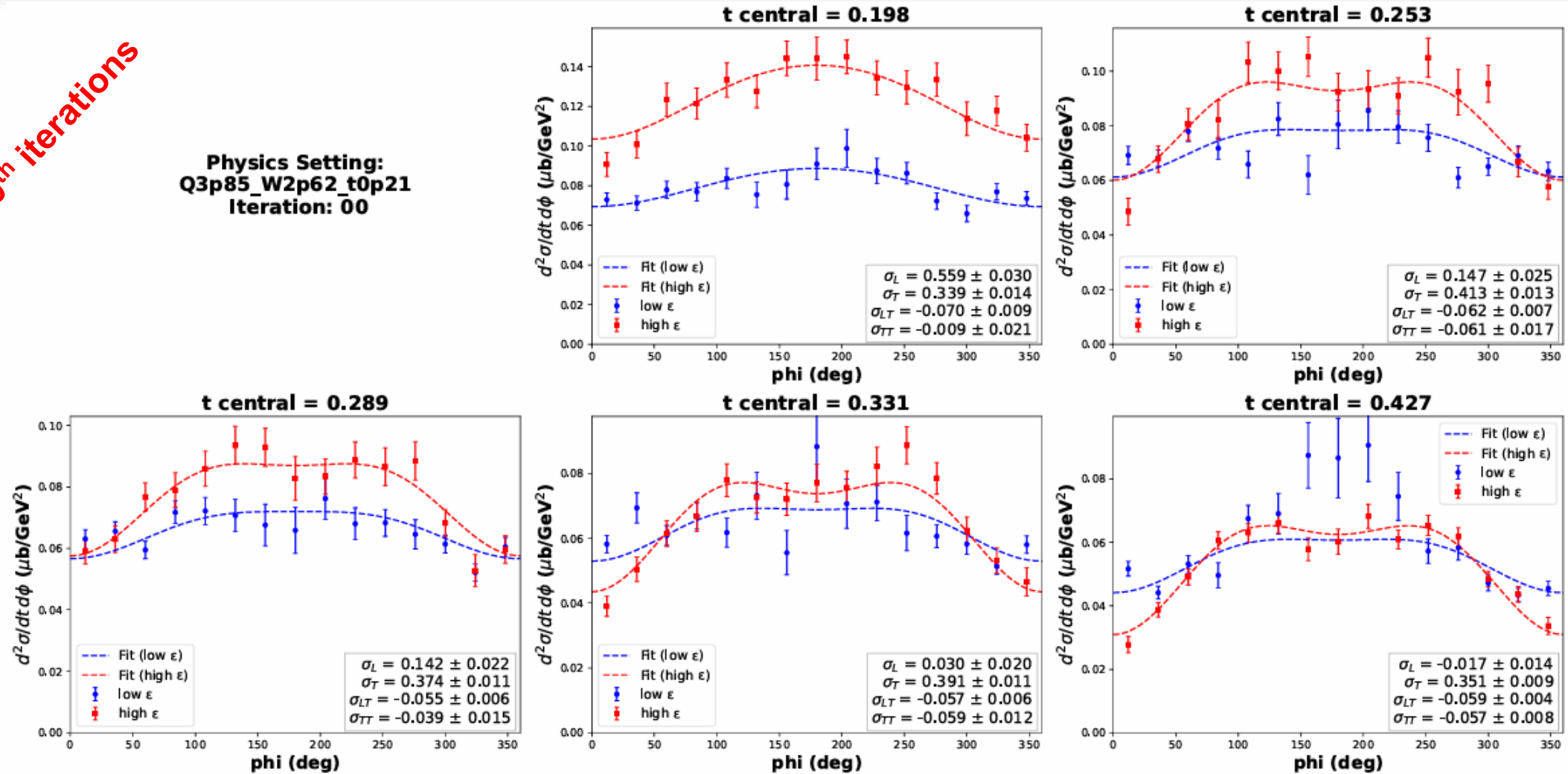
Physics Setting:
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Un-separated Cross-sections

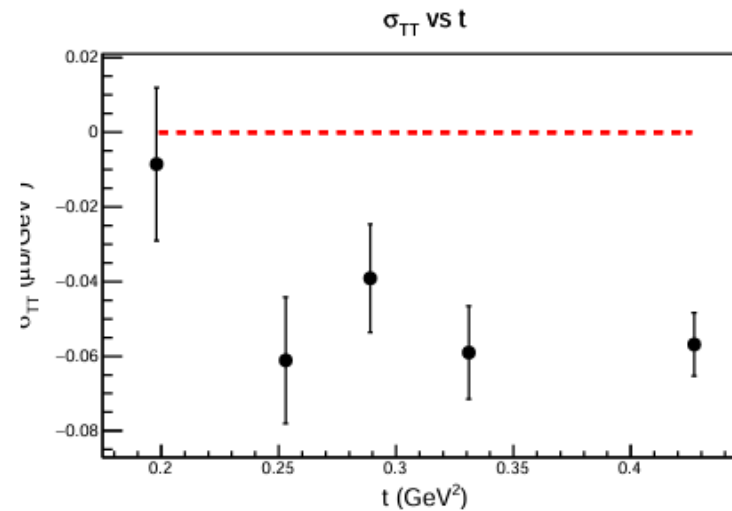
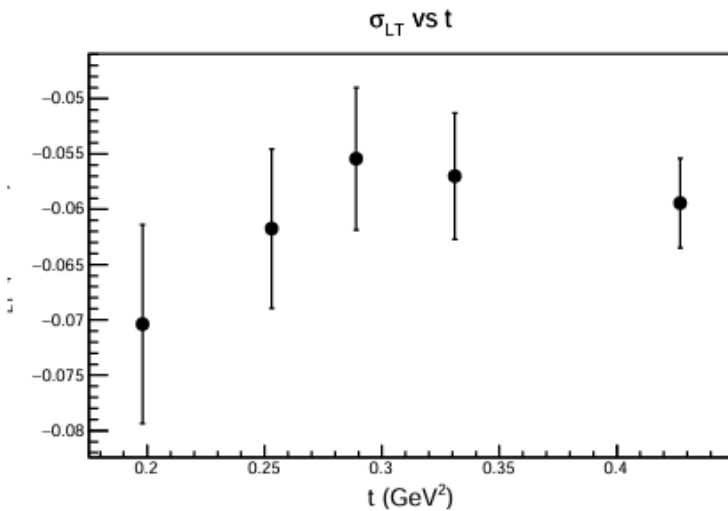
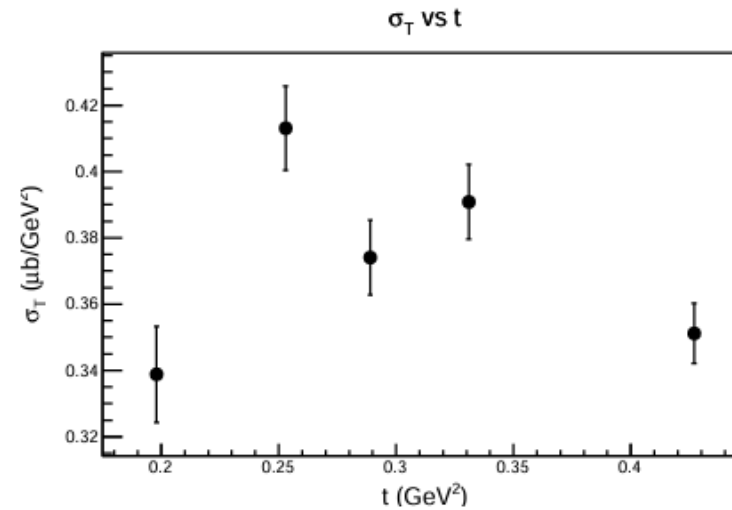
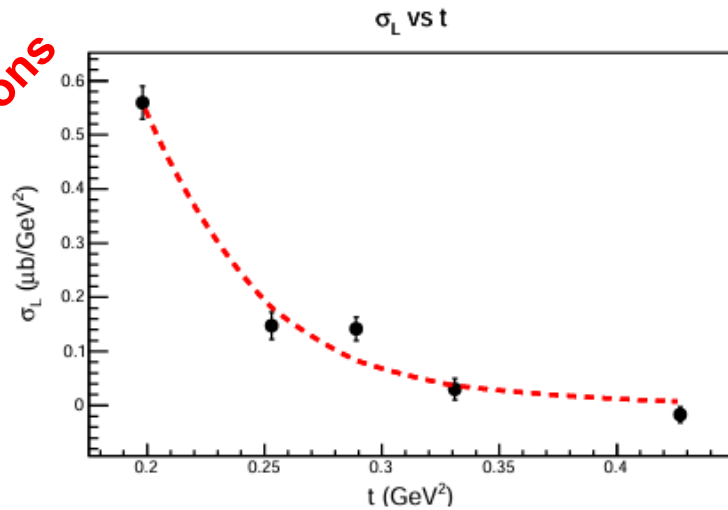
0th iterations

Physics Setting:
Q3p85_W2p62_t0p21
Iteration: 00



LT-separated Cross-sections

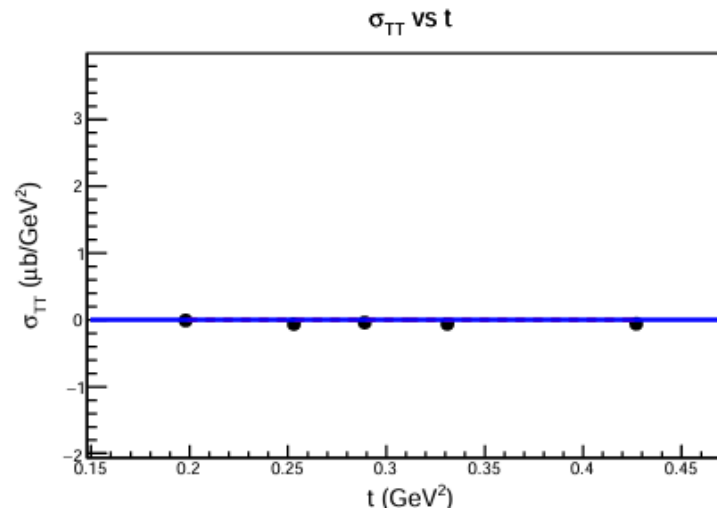
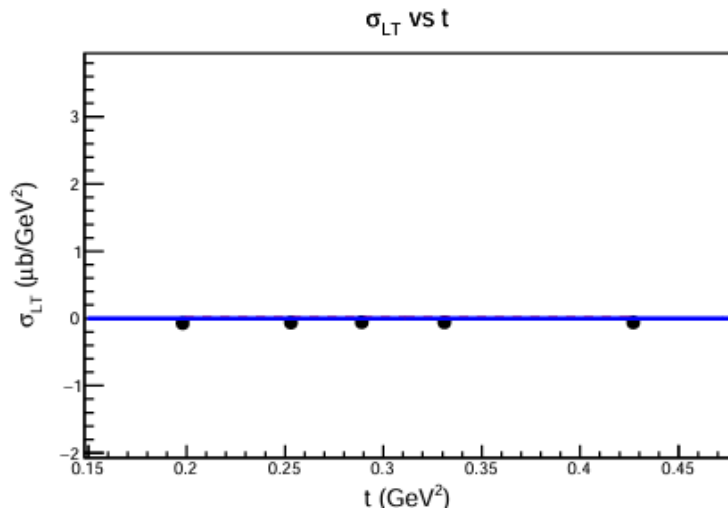
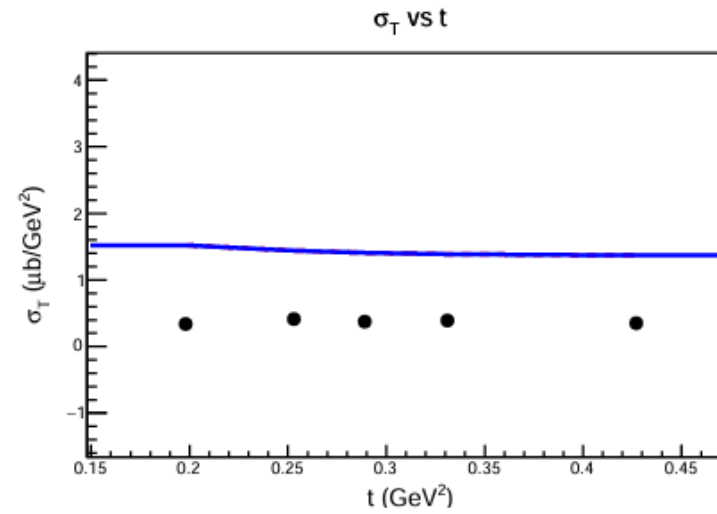
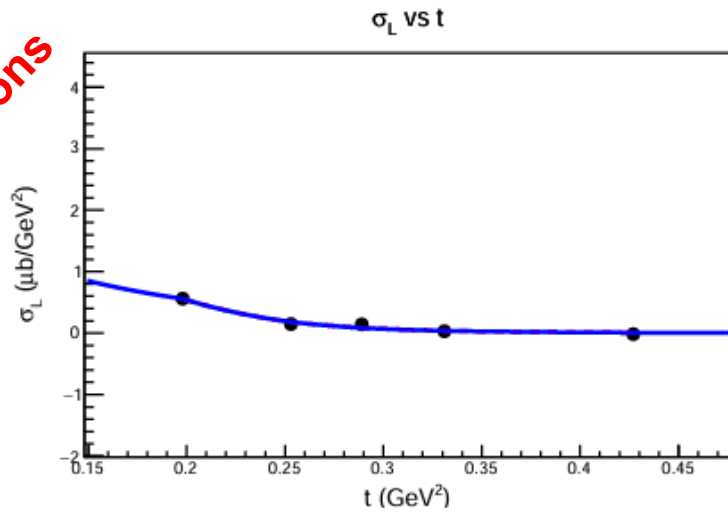
0th iterations



Parameter	Initial Values	New Values
p1	3.9	3.9
p2	5.8	5.8
p5	37.08	-38.9
p6	-6.35	153.6
p7	-4.11	-4.11
P8	1.6	1.6
P9	-0.015	-0.015
p10	-10000	-10000
p11	0.0	0.0
p12	0.0	0.0
p13	0.0	0.0
p14	0.0	0.0

LT-separated Cross-sections

0th iterations



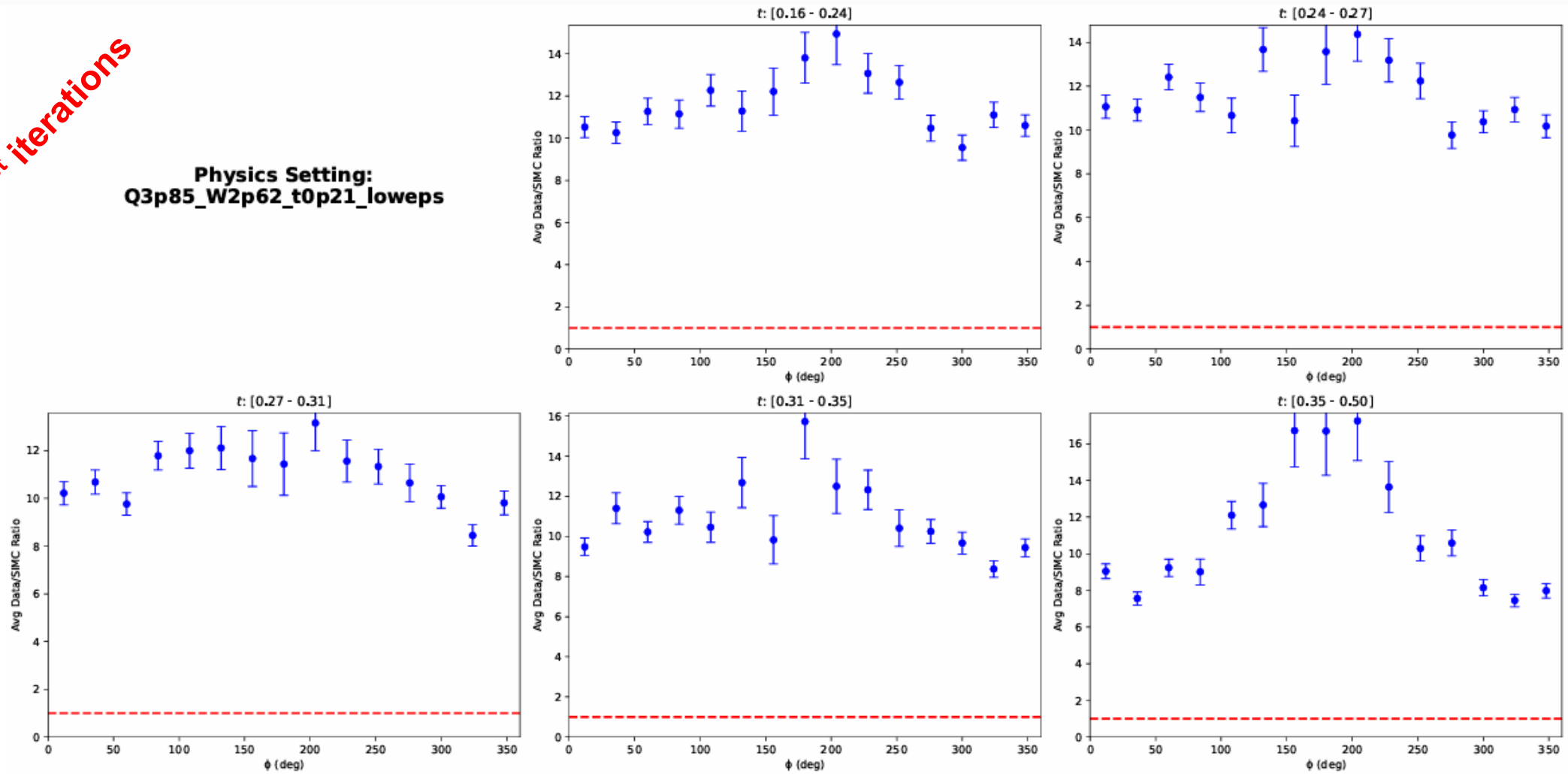
Parameter	Initial Values	New Values
p1	3.9	3.9
p2	5.8	5.8
p5	37.08	-38.9
p6	-6.35	153.6
p7	-4.11	-4.11
P8	1.6	1.6
P9	-0.015	-0.015
p10	-10000	-10000
p11	0.0	0.0
p12	0.0	0.0
p13	0.0	0.0
p14	0.0	0.0

Iteration 01

Physics Ratios

1st iterations

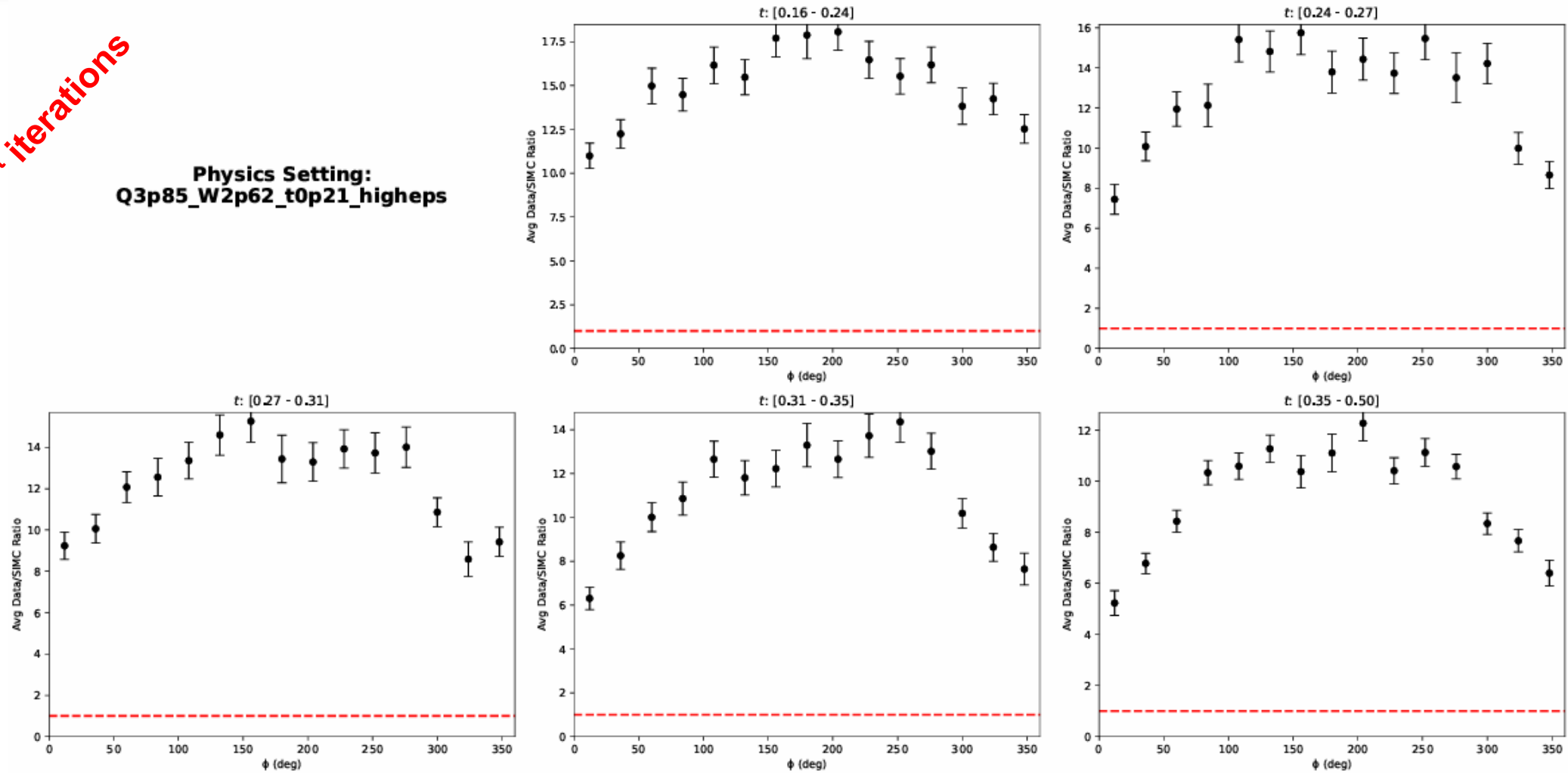
Physics Setting:
Q3p85_W2p62_t0p21_loweps



Physics Ratios

1st iterations

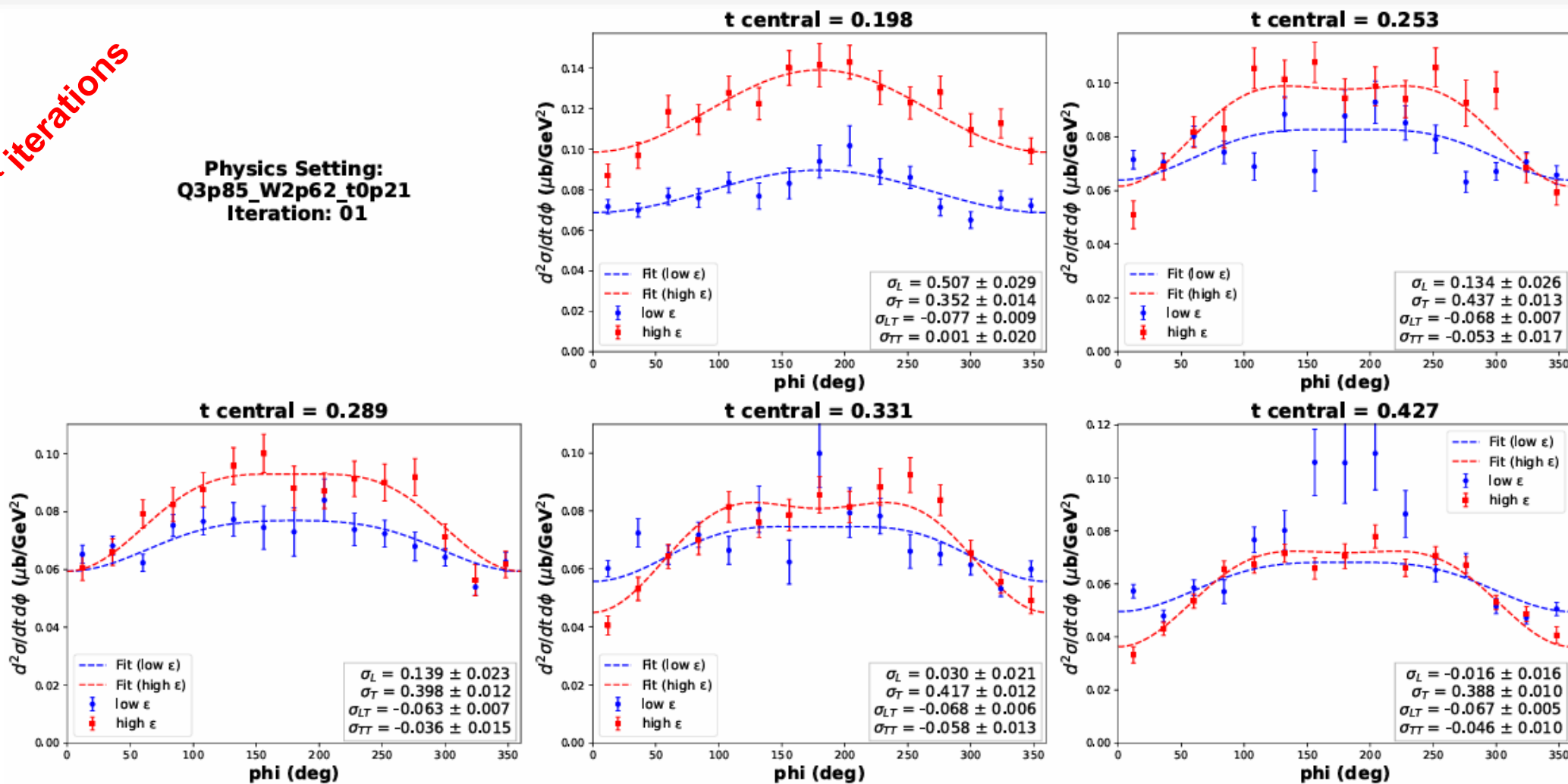
Physics Setting:
Q3p85_W2p62_t0p21_higheps



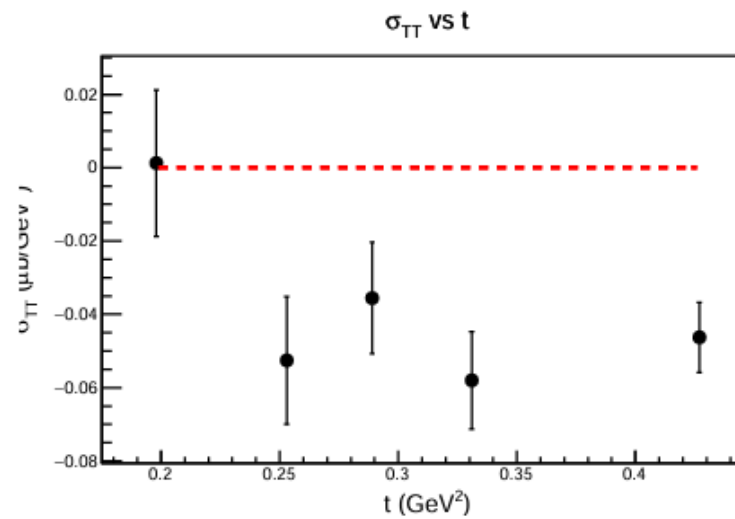
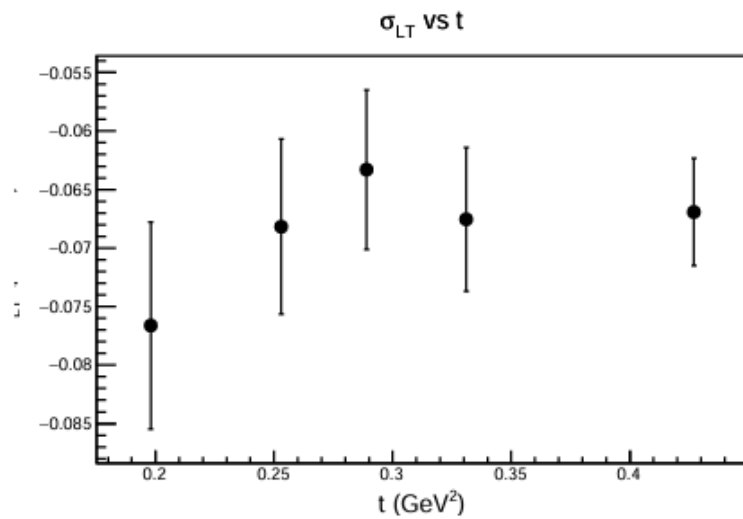
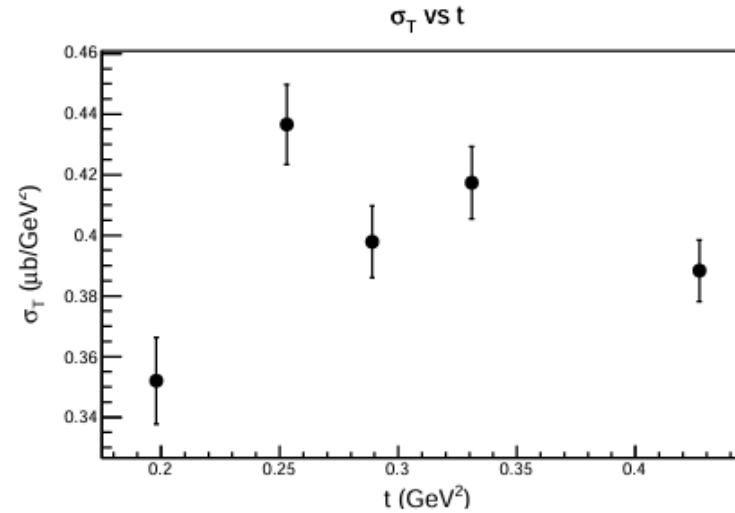
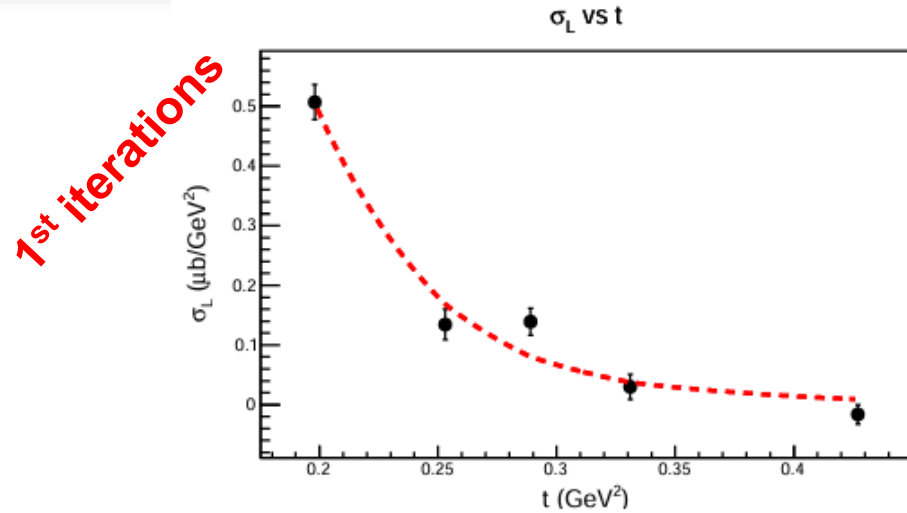
Un-separated Cross-sections

1st iterations

Physics Setting:
Q3p85_W2p62_t0p21
Iteration: 01



LT-separated Cross-sections

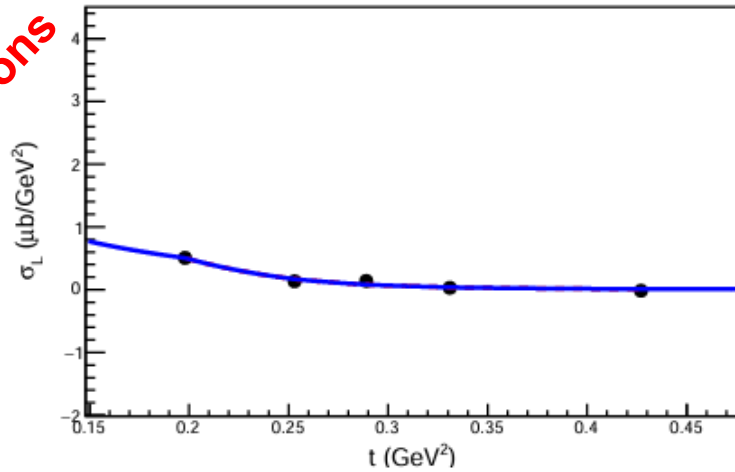


Parameter	Initial Values	New Values
p1	3.9	3.9
p2	5.8	5.8
p5	-38.9	-33.9
p6	153.6	134.6
p7	-4.11	-4.11
P8	1.6	1.6
P9	-0.015	-0.015
p10	-10000	-10000
p11	0.0	0.0
p12	0.0	0.0
p13	0.0	0.0
p14	0.0	0.0

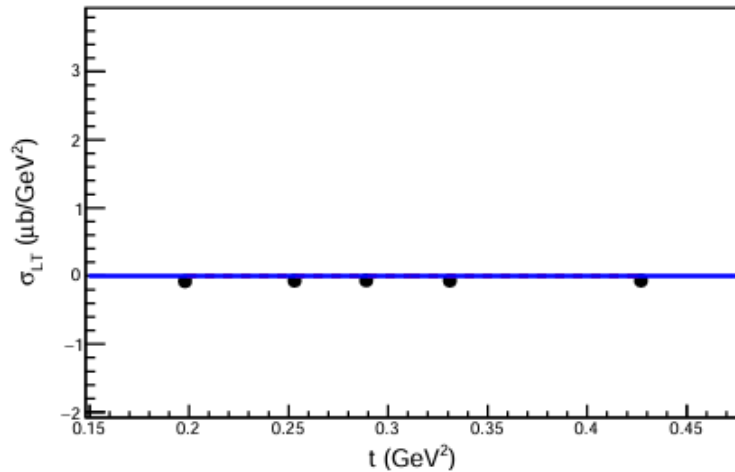
LT-separated Cross-sections

1st iterations

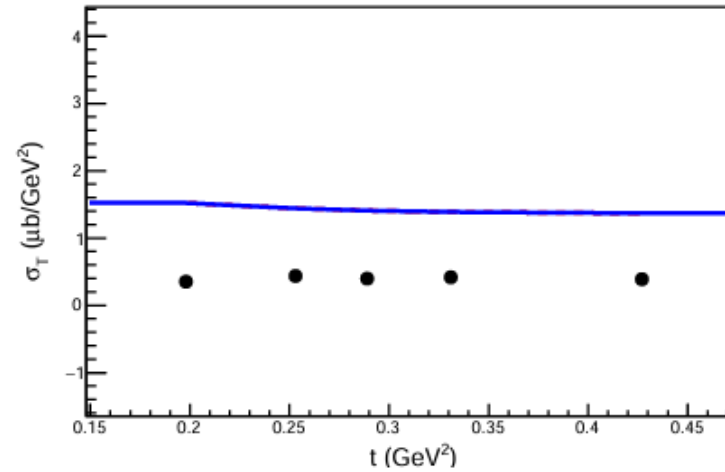
σ_L vs t



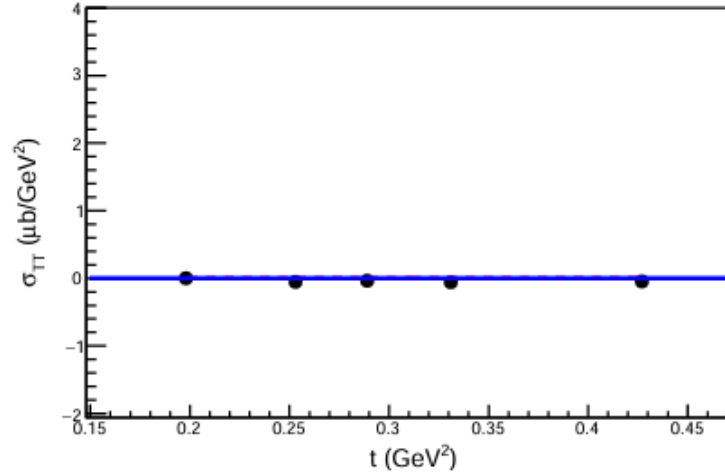
σ_{LT} vs t



σ_T vs t



σ_{TT} vs t



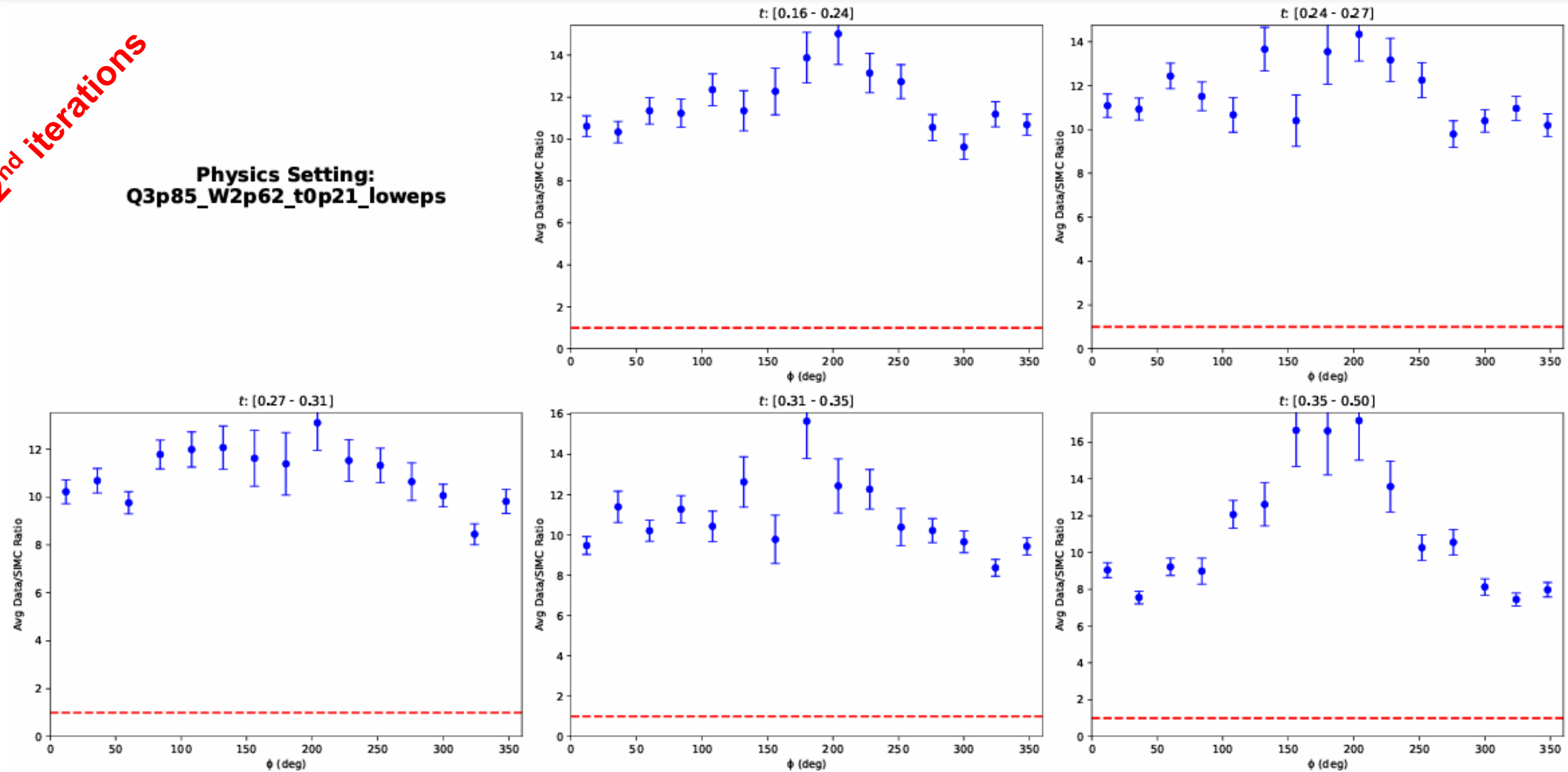
Parameter	Initial Values	New Values
p1	3.9	3.9
p2	5.8	5.8
p5	-38.9	-33.9
p6	153.6	134.6
p7	-4.11	-4.11
P8	1.6	1.6
P9	-0.015	-0.015
p10	-10000	-10000
p11	0.0	0.0
p12	0.0	0.0
p13	0.0	0.0
p14	0.0	0.0

Iteration 02

Physics Ratios

2nd iterations

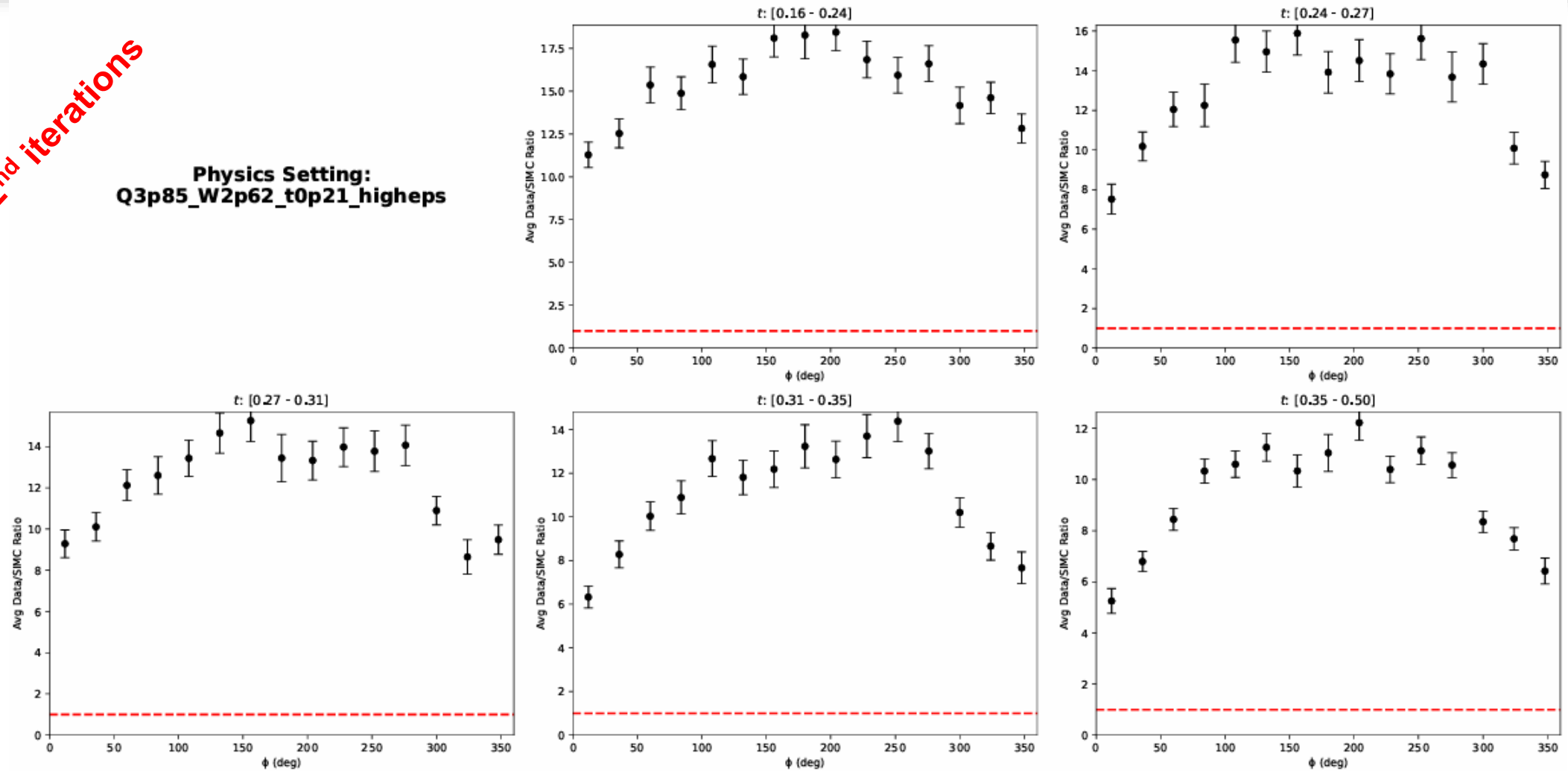
Physics Setting:
Q3p85_W2p62_t0p21_loweps



Physics Ratios

2nd iterations

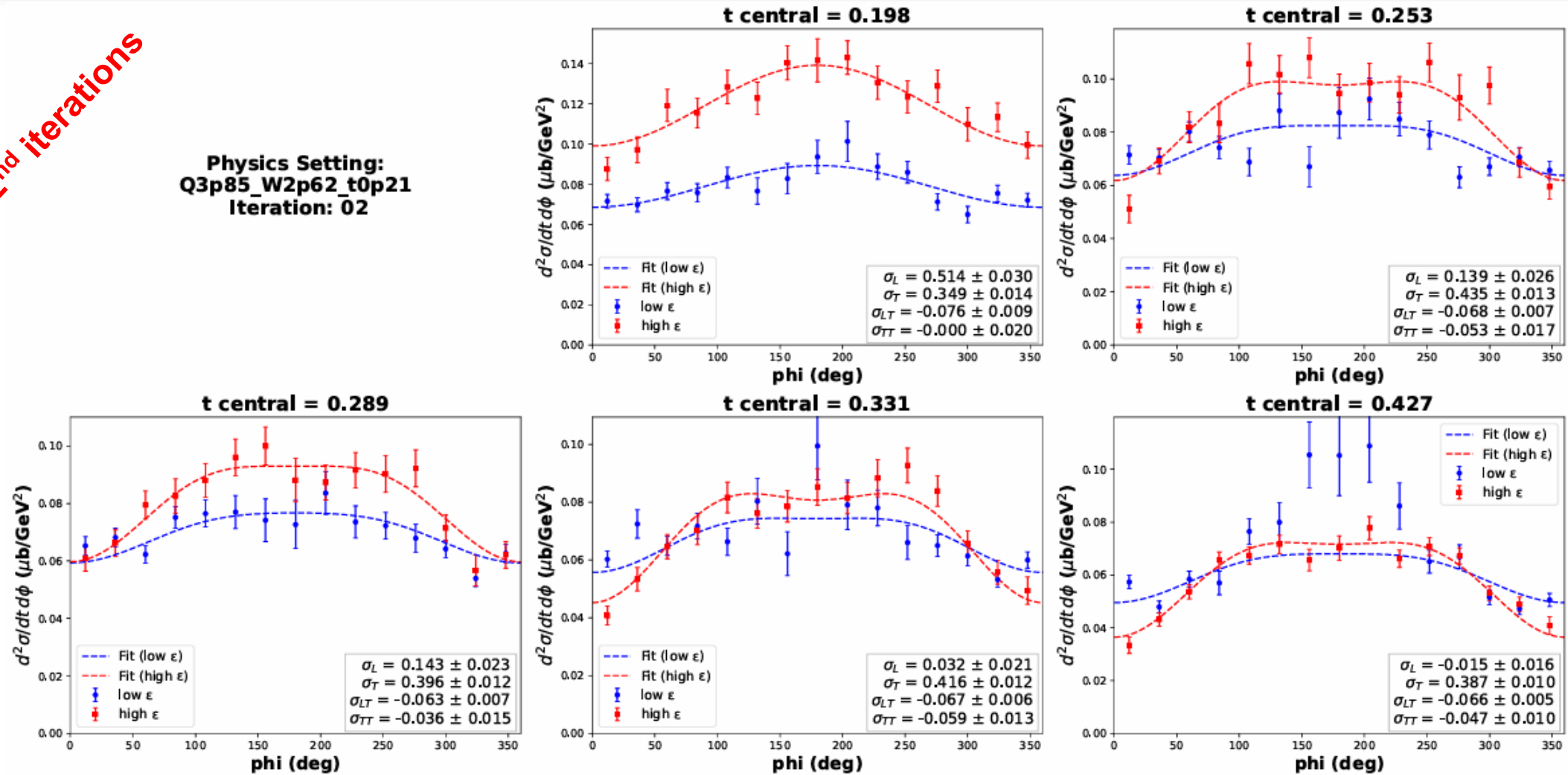
Physics Setting:
Q3p85_W2p62_t0p21_higheps



Un-separated Cross-sections

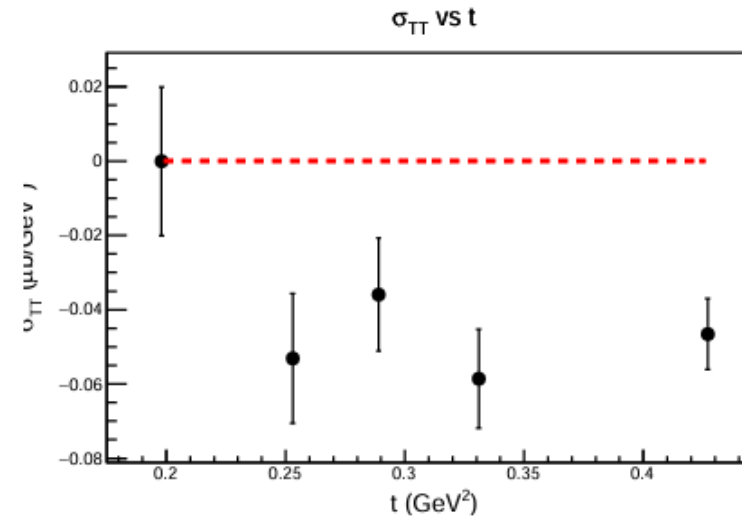
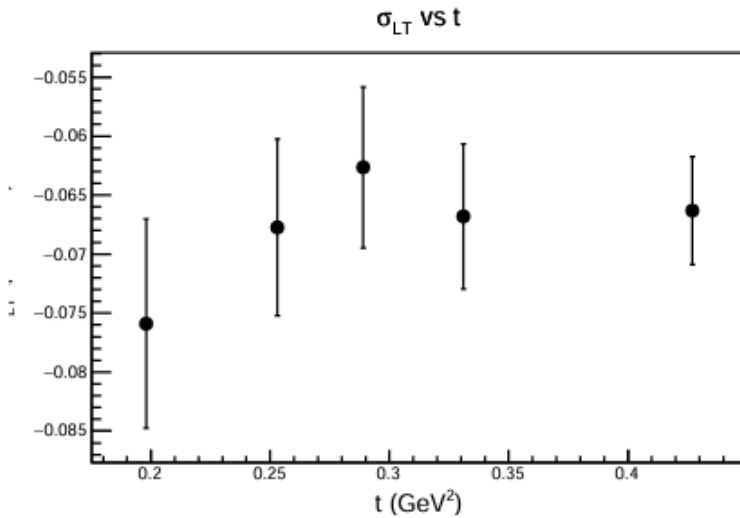
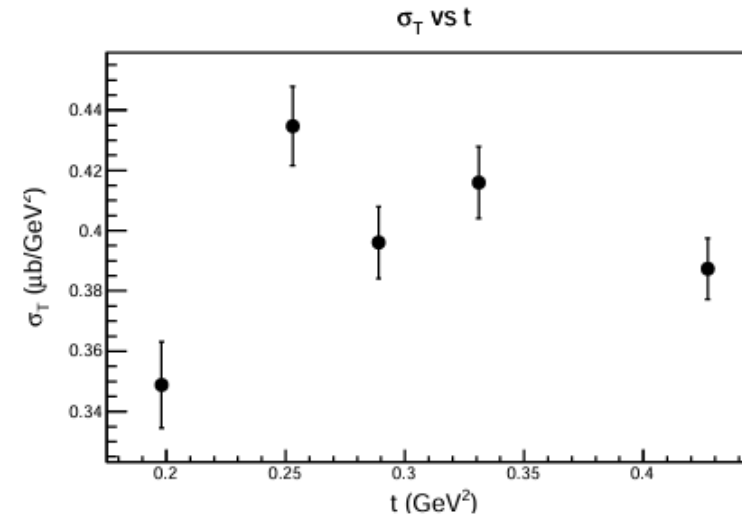
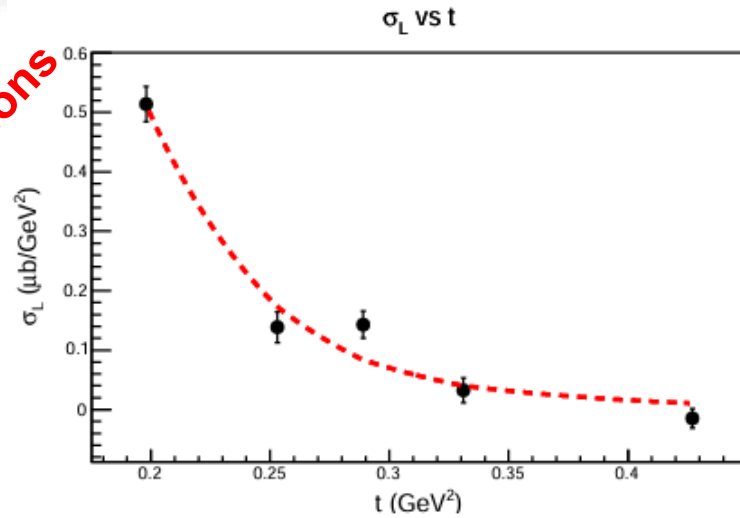
2nd iterations

Physics Setting:
Q3p85_W2p62_t0p21
Iteration: 02



LT-separated Cross-sections

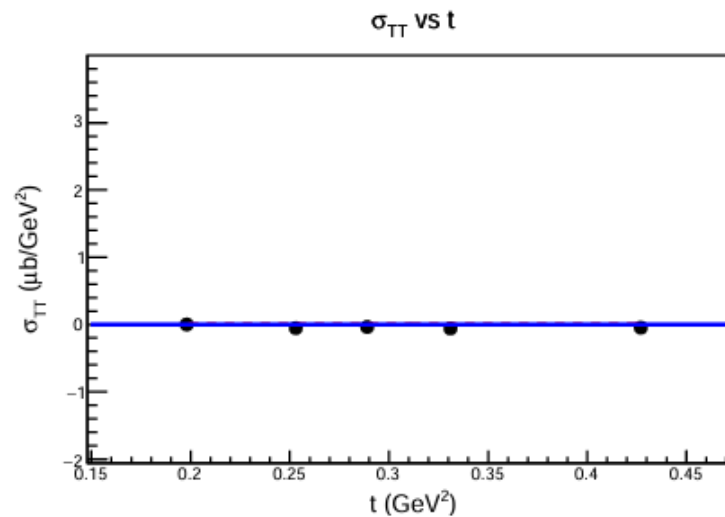
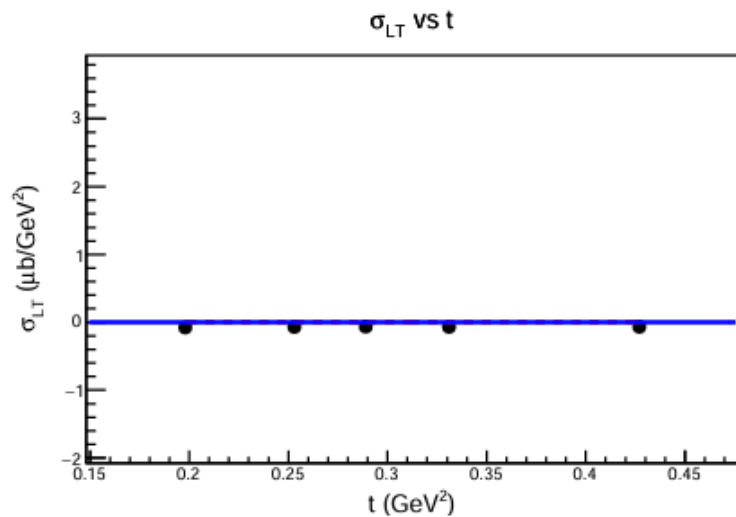
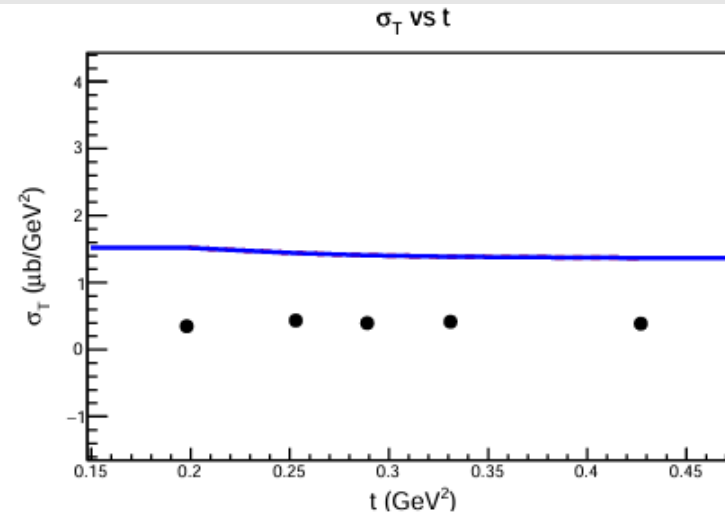
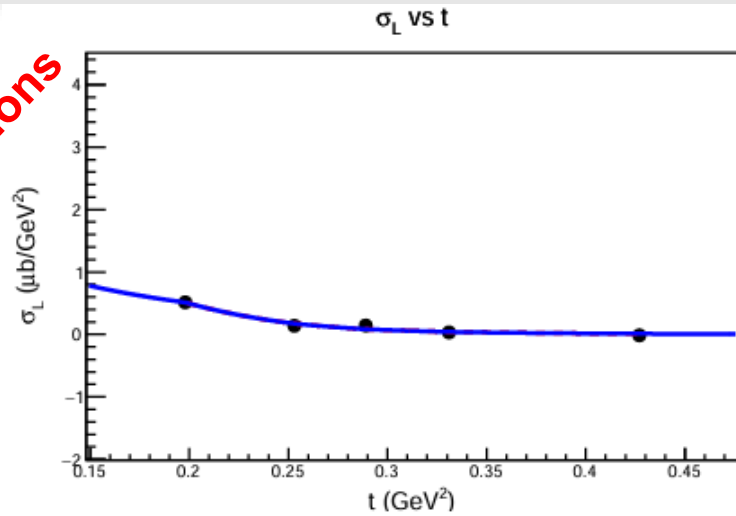
2nd iterations



Parameter	Initial Values	New Values
p1	3.9	3.9
p2	5.8	5.8
p5	-33.9	-33.9
p6	134.6	134.6
p7	-4.11	-4.11
P8	1.6	1.6
P9	-0.015	-0.015
p10	-10000	-10000
p11	0.0	0.0
p12	0.0	0.0
p13	0.0	0.0
p14	0.0	0.0

LT-separated Cross-sections

2nd iterations



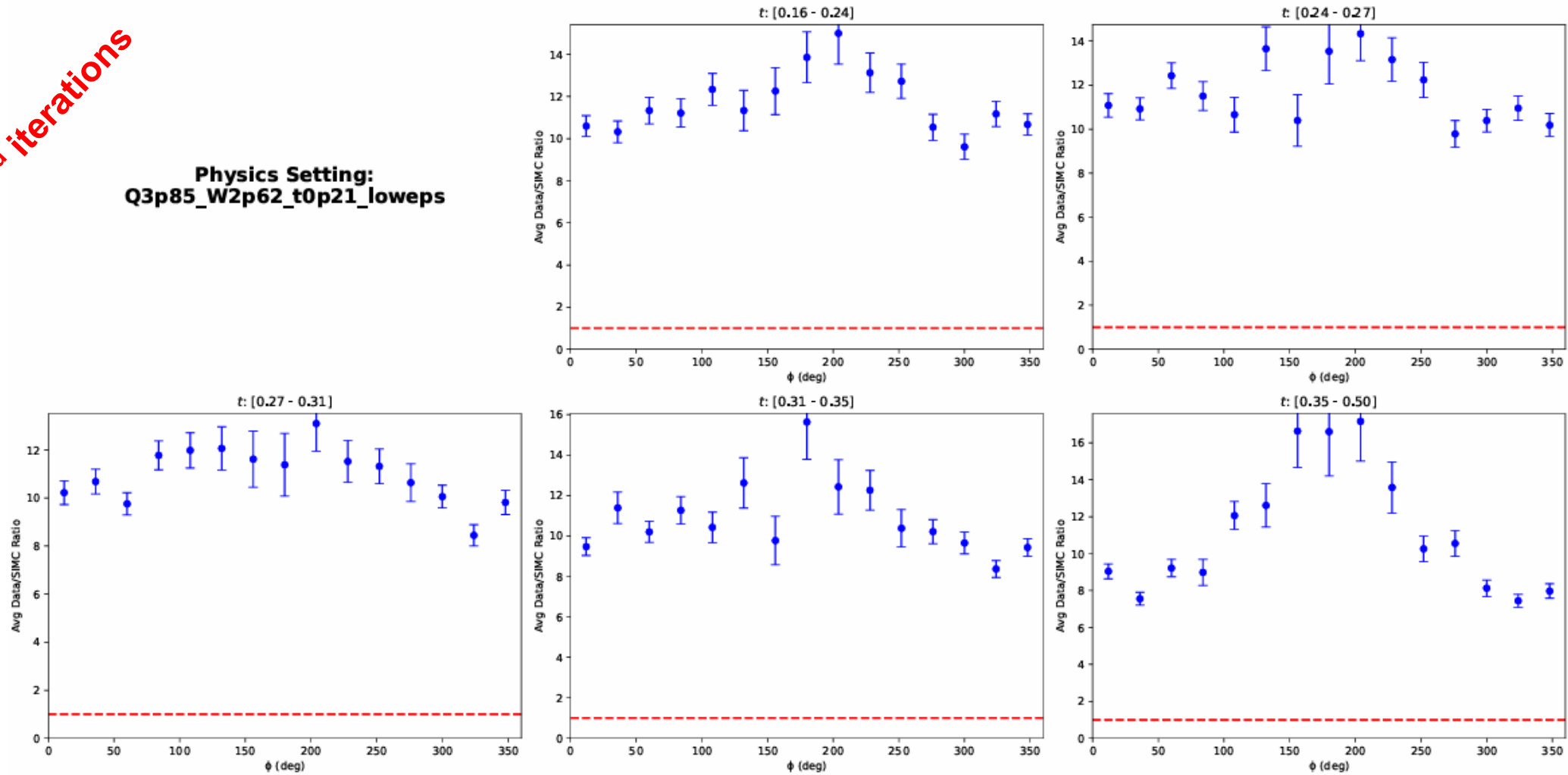
Parameter	Initial Values	New Values
p1	3.9	3.9
p2	5.8	5.8
p5	-33.9	-33.9
p6	134.6	134.6
p7	-4.11	-4.11
P8	1.6	1.6
P9	-0.015	-0.015
p10	-10000	-10000
p11	0.0	0.0
p12	0.0	0.0
p13	0.0	0.0
p14	0.0	0.0

Iteration 03

Physics Ratios

3rd iterations

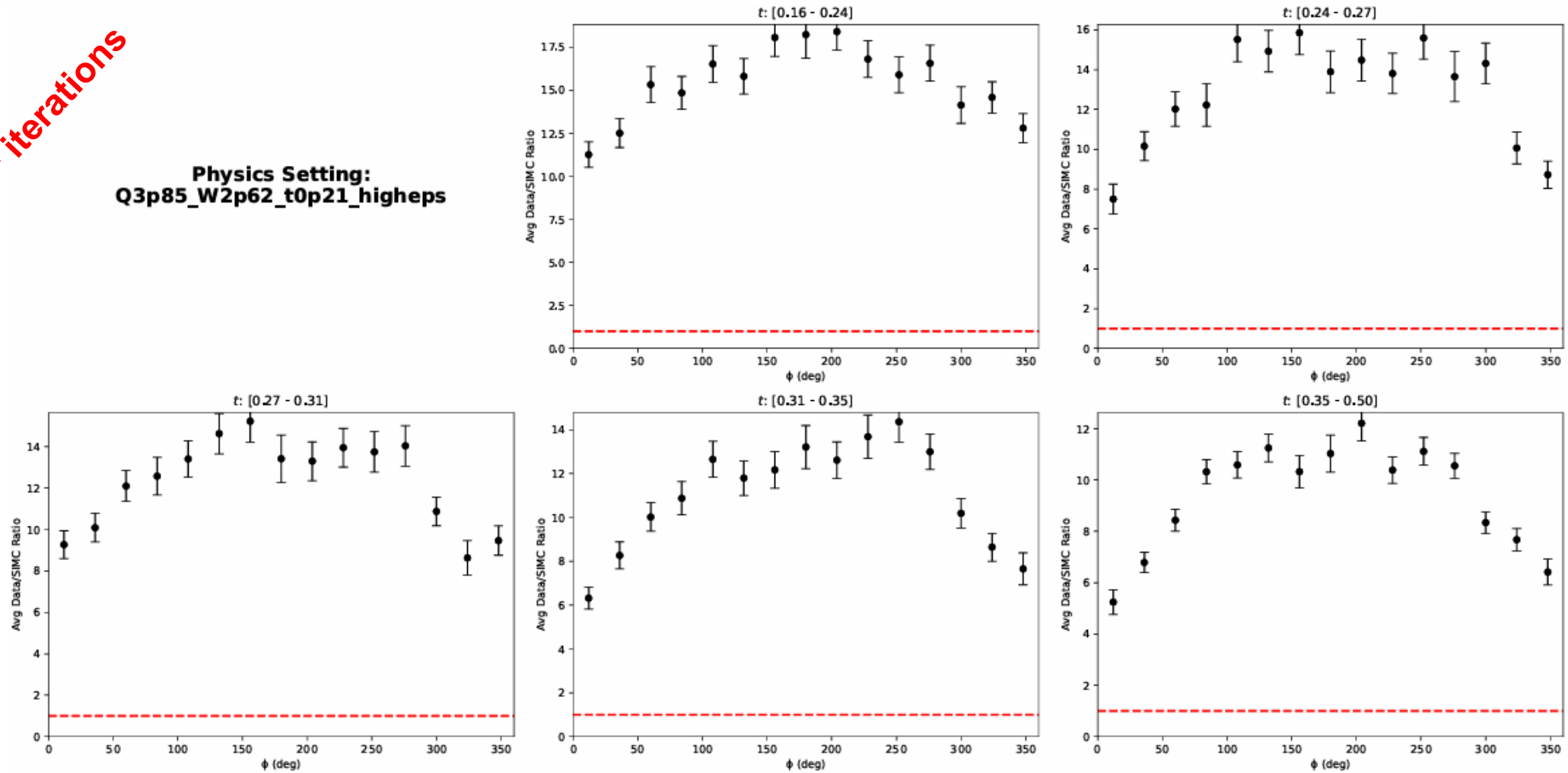
Physics Setting:
Q3p85_W2p62_t0p21_loweps



Physics Ratios

3rd iterations

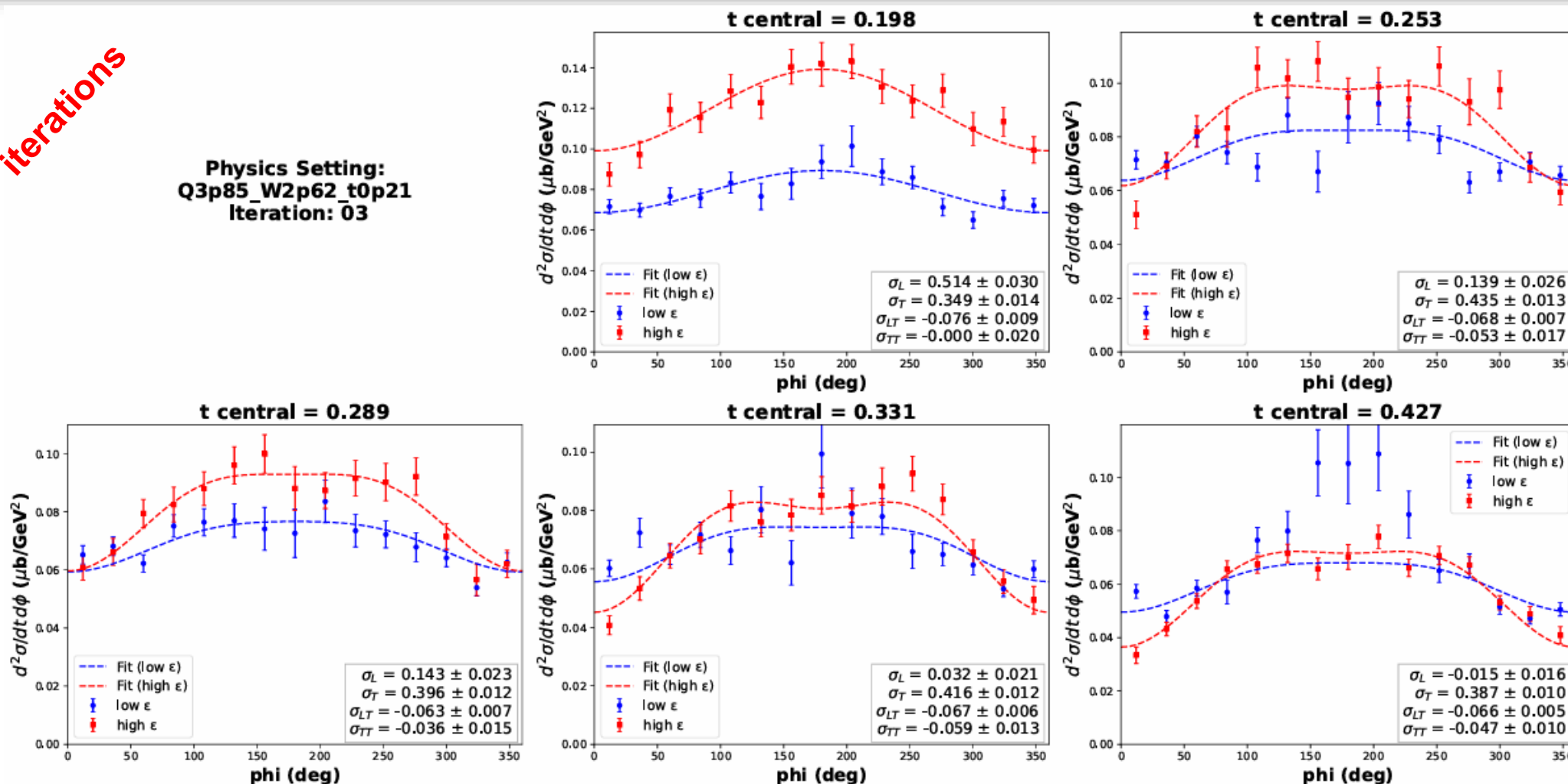
Physics Setting:
Q3p85_W2p62_t0p21_higheps



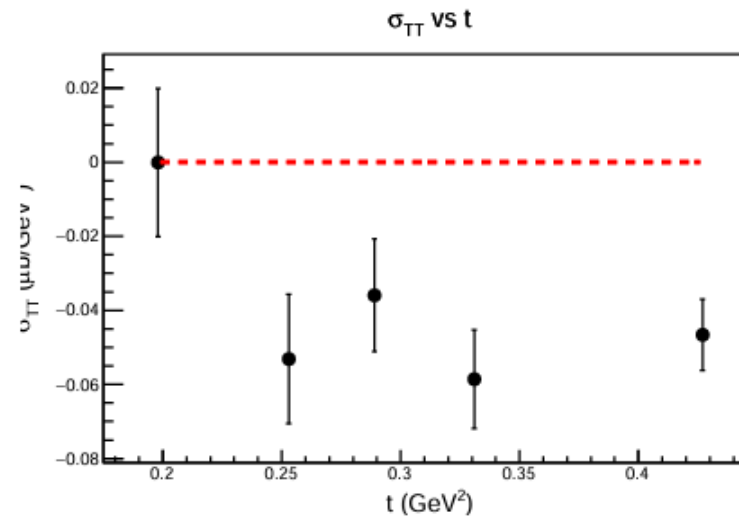
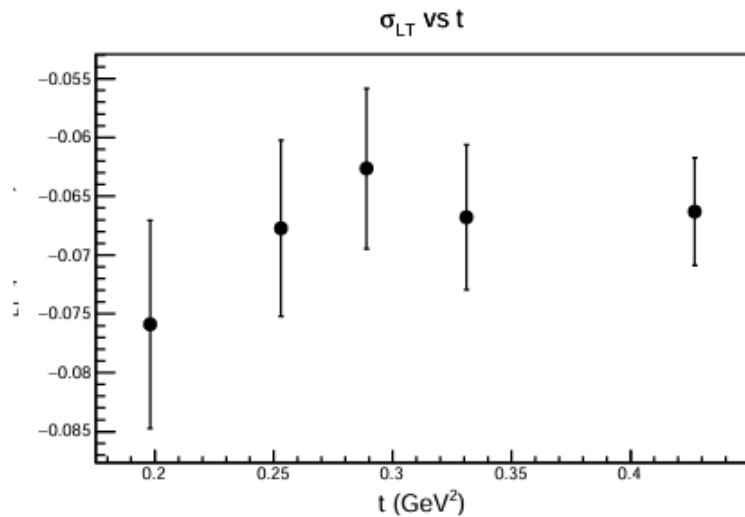
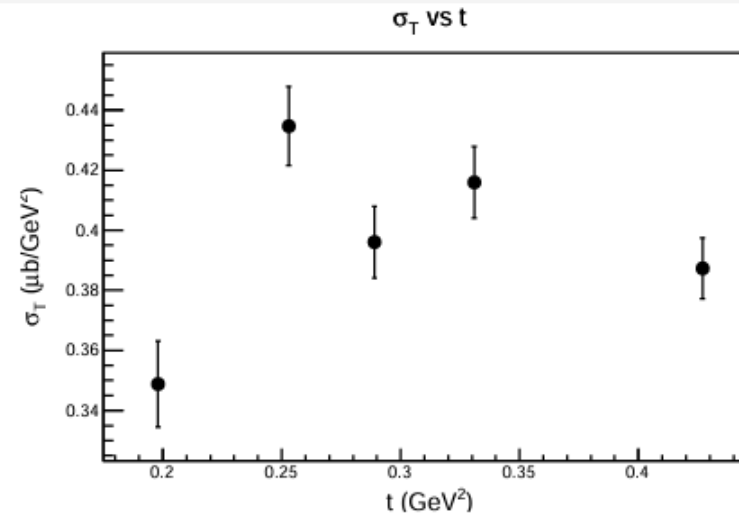
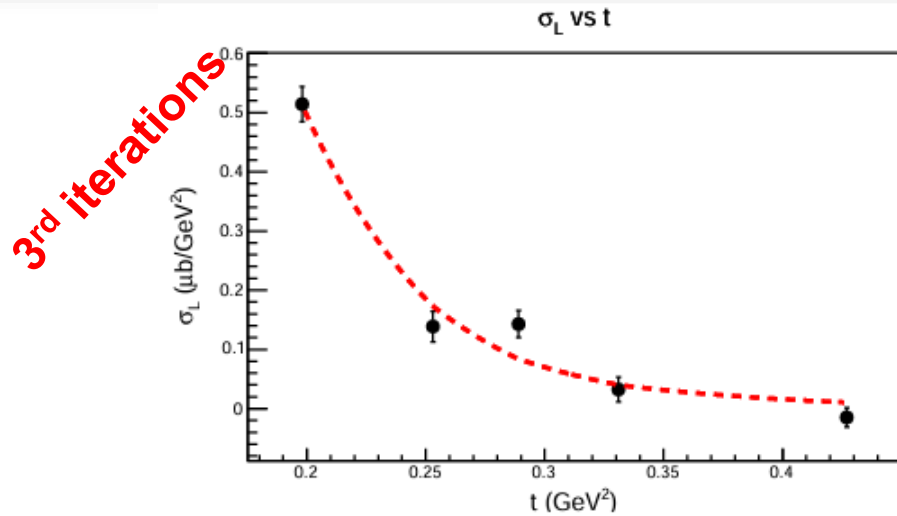
Un-separated Cross-sections

3rd iterations

Physics Setting:
Q3p85_W2p62_t0p21
Iteration: 03



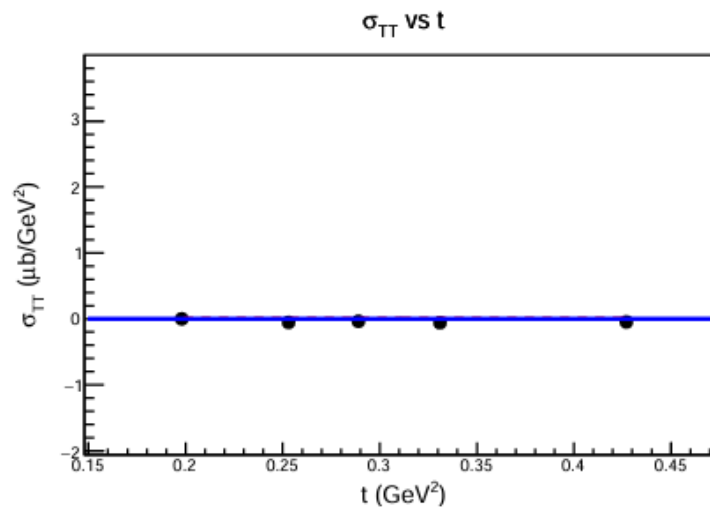
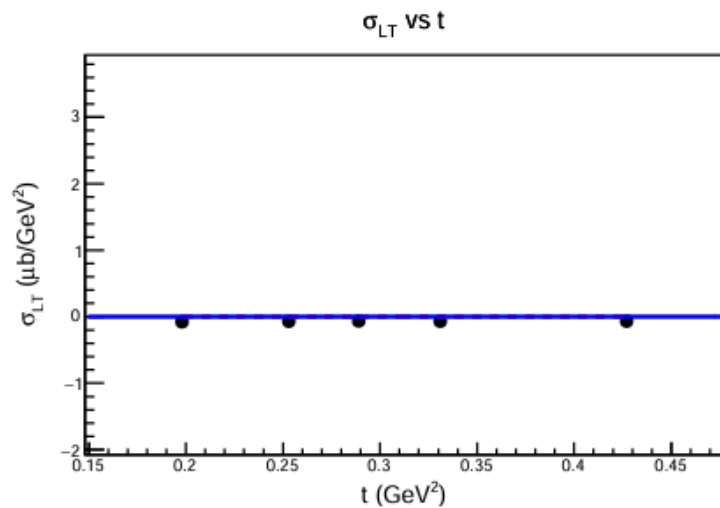
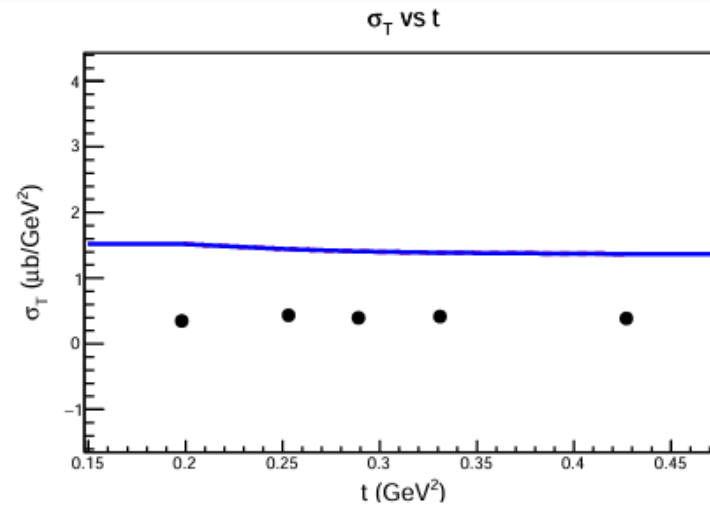
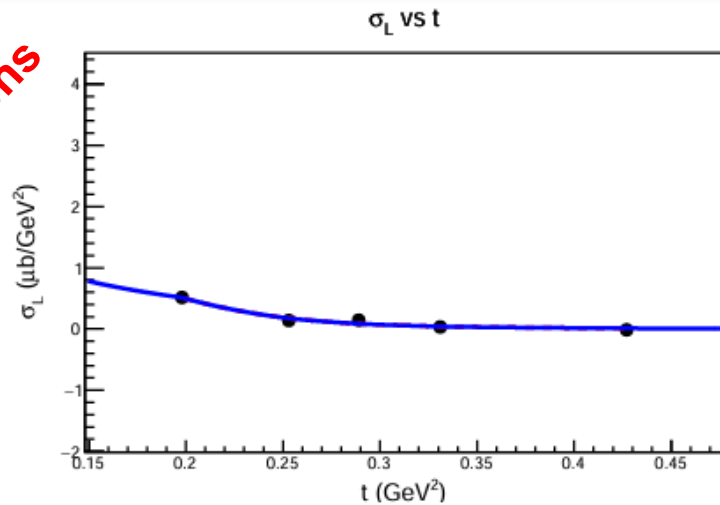
LT-separated Cross-sections



Parameter	Initial Values	New Values
p1	3.9	3.9
p2	5.8	5.8
p5	-33.9	-33.9
p6	134.6	134.6
p7	-4.11	-4.11
P8	1.6	1.6
P9	-0.015	-0.015
p10	-10000	-10000
p11	0.0	0.0
p12	0.0	0.0
p13	0.0	0.0
p14	0.0	0.0

LT-separated Cross-sections

3rd iterations



Parameter	Initial Values	New Values
p1	3.9	3.9
p2	5.8	5.8
p5	-33.9	-33.9
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P8	1.6	1.6
P9	-0.015	-0.015
p10	-10000	-10000
p11	0.0	0.0
p12	0.0	0.0
p13	0.0	0.0
p14	0.0	0.0

LTSep Analysis

- ❑ Working on physics setting: “ $Q^2 = 3.85$, $W = 2.62$, $t = 0.21$ (2 epsilons)”
- ❑ The following studies have been finalized for Pion Form Factor measurement:
 - Unseparated cross-section calculations
 - Model iterations
 - Rosenbluth equation fitting
 - L/T separated cross-section calculations
- ❑ In progress:
 - ❖ Working on model iterations.
 - ❖ Next plan is to include sigma LT and sigma TT terms in iterations.