

LHRS Analysis for d_2^n

Radiative Corrections to Real Data and Δ Form Factors

D. Flay

2/23/12

Outline

- 1 Radiative Corrections to Real Data
- 2 Δ Radiative Tail
- 3 Summary

Radiative Corrections to Data (1)

Method

- Since the QFS fit is not great, we want a fit that goes through all the data points

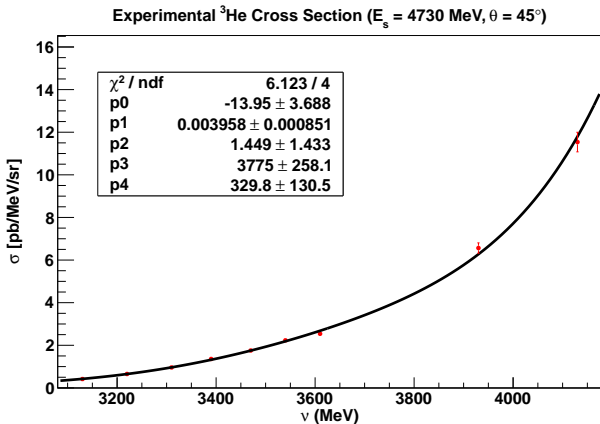
- Use:

$$f(x) = e^{(p_0+p_1x)} + p_2e^{-\frac{1}{2}\left(\frac{x-p_3}{p_4}\right)^2}$$

- This way, the results of the RC's to this data set **is** the Born cross section

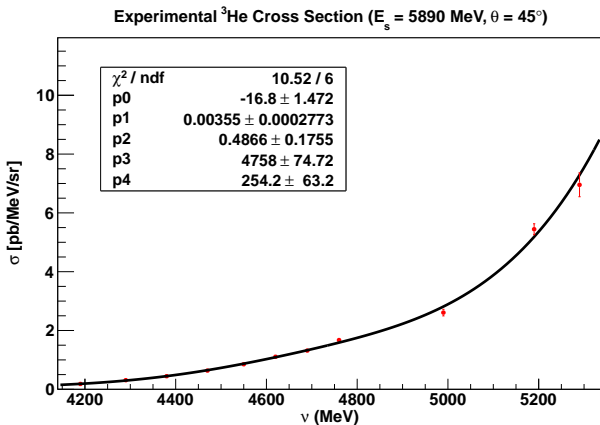
Radiative Corrections to Data (2)

Fit at $E_s = 4730$ MeV



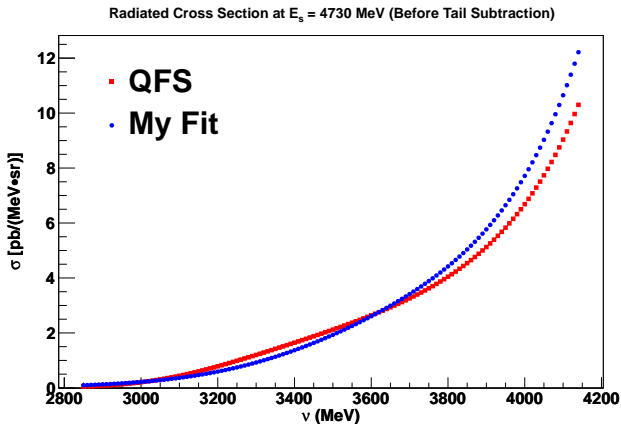
Radiative Corrections to Data (3)

Fit at $E_s = 5890$ MeV



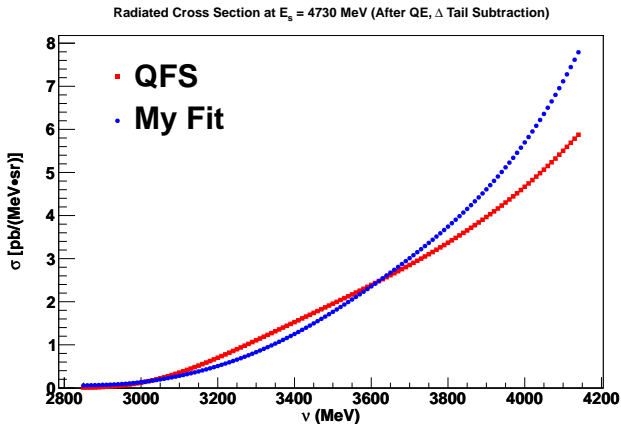
Radiative Corrections to Data (3)

Comparison to QFS at $E_s = 4730$ MeV



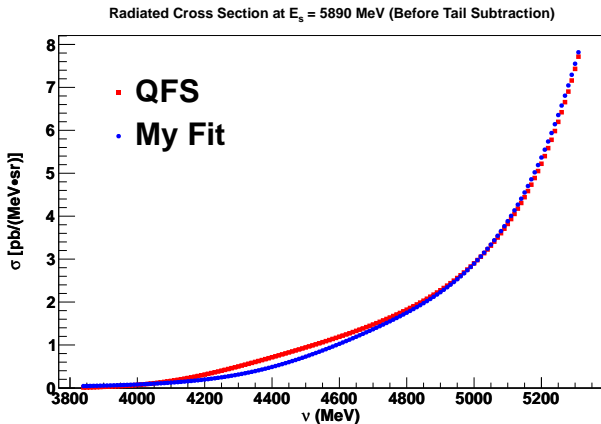
Radiative Corrections to Data (4)

Comparison to QFS at $E_s = 4730$ MeV



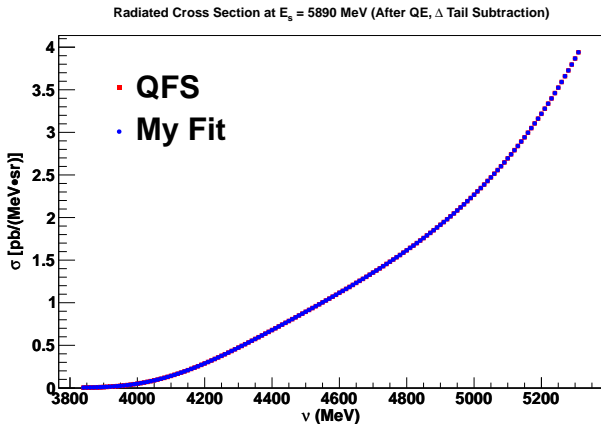
Radiative Corrections to Data (5)

Comparison to QFS at $E_s = 5890$ MeV



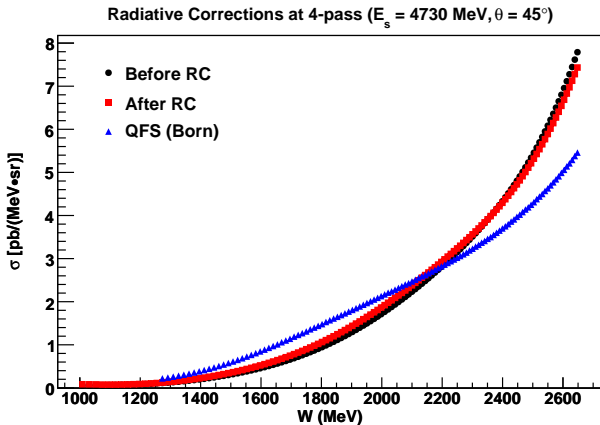
Radiative Corrections to Data (6)

Comparison to QFS at $E_s = 5890$ MeV



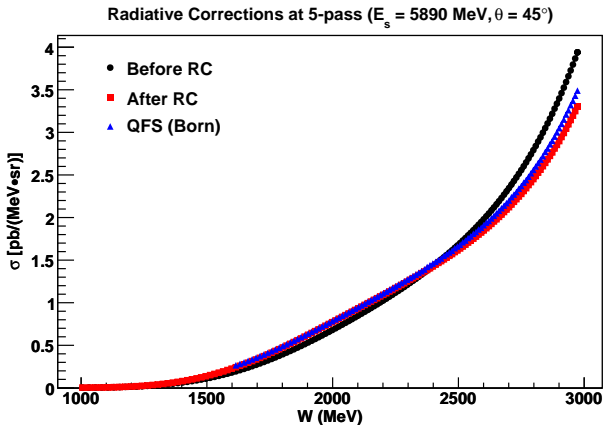
Radiative Corrections to Data (7)

RADCOR Results at $E_s = 4730$ MeV



Radiative Corrections to Data (8)

RADCOR Results at $E_s = 5890$ MeV



△ Radiative Tail (1)

Carlson's Fit

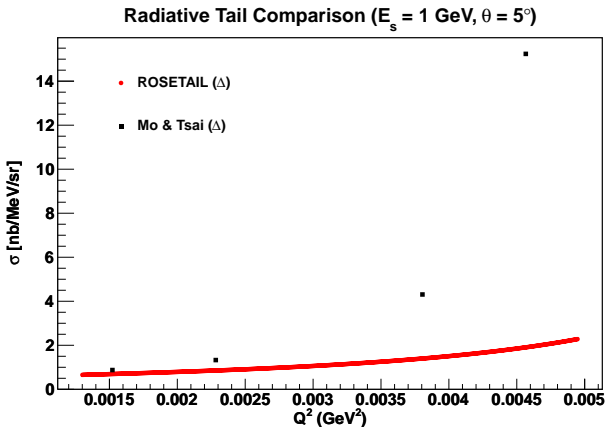
- From last time:

$$G_M^*(Q^2) = \frac{1}{\sqrt{1 + Q^2/M^{*2}}} G_D(Q^2)$$

- $G_E^* = 0$, as per DESY data and the various papers referenced the last time

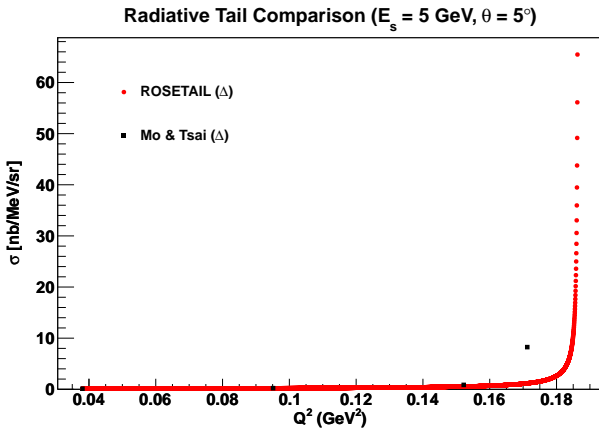
△ Radiative Tail (2)

Testing Against Mo & Tsai



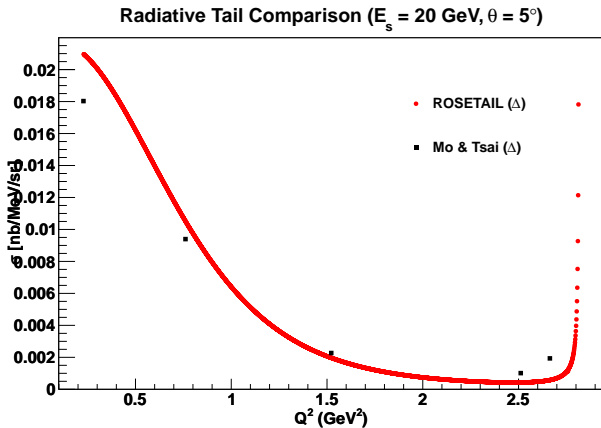
△ Radiative Tail (3)

Testing Against Mo & Tsai



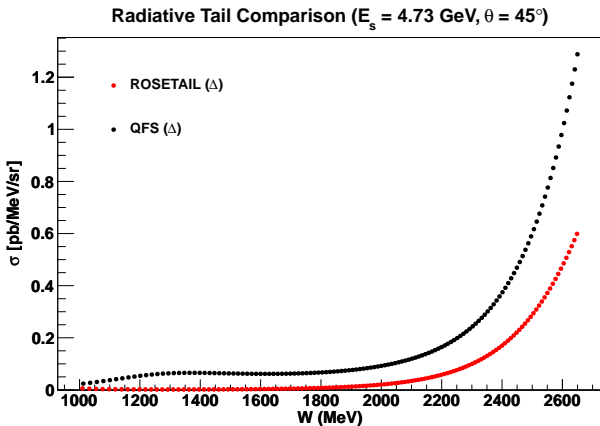
Δ Radiative Tail (4)

Testing Against Mo & Tsai



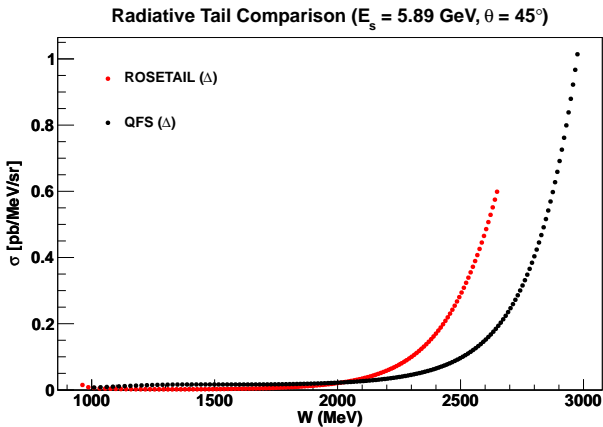
△ Radiative Tail (5)

$E_s = 4730 \text{ MeV}$



Δ Radiative Tail (6)

$E_s = 5890 \text{ MeV}$



Summary

- Exponential & gaussian fit does not yield good agreement with QFS fit
 - Something funny is happening at $E_s = 4730$ MeV
 - QFS fit will need to be revisited – too many parameters, unphysical polynomial fits may be introducing unwanted structure
- Carlson fit agrees with QFS in terms of shape

What's Next?

- Revisit QFS fit: use gaussians instead of polynomials
- Figure out issues in the zero-width approximation to reproduce results of Mo & Tsai
- Improvements to Carlson's fit?