LHRS Analysis for d_2^n

Updated Cross Sections and Radiative Corrections

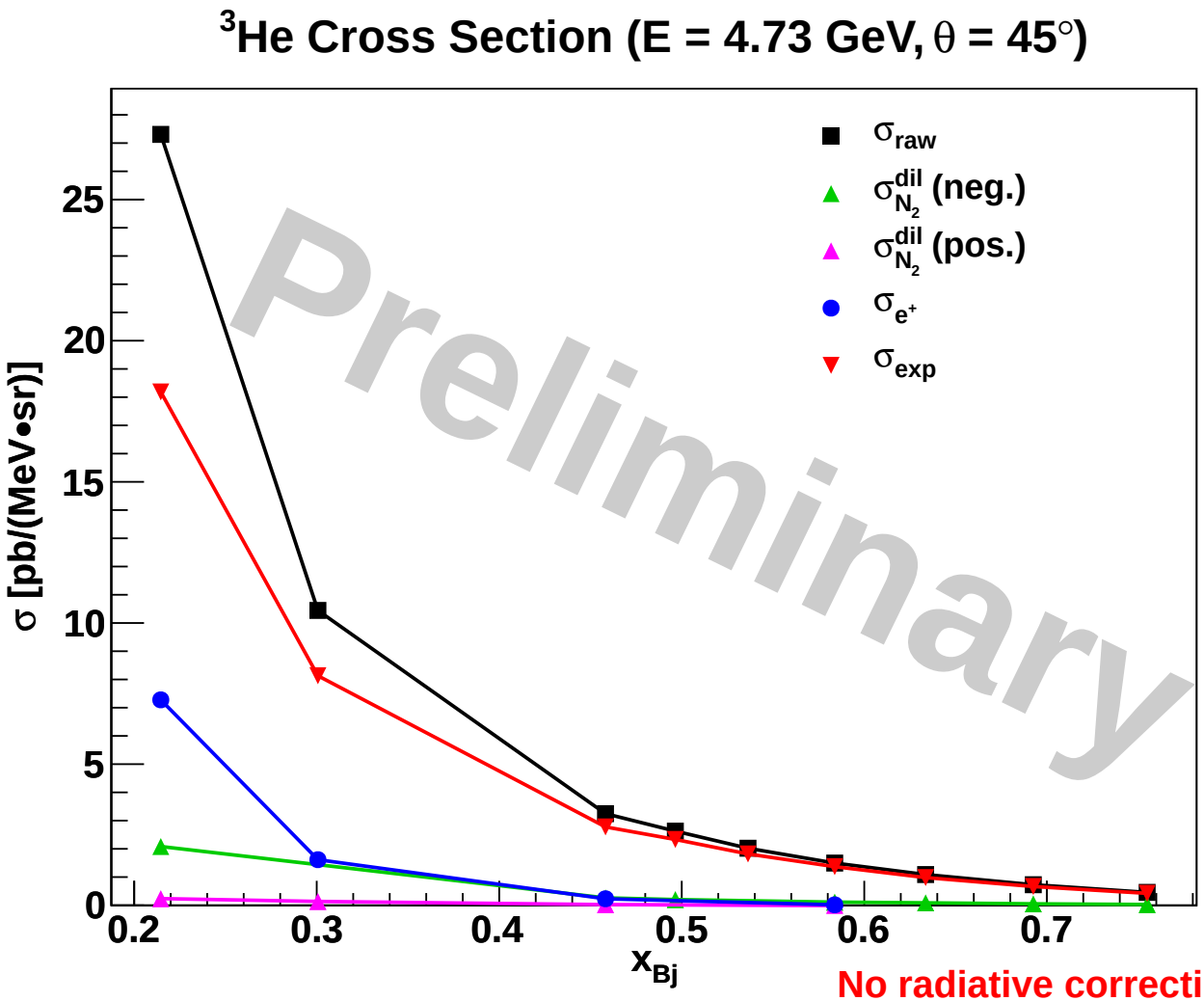
D. Flay

7/21/11

Outline

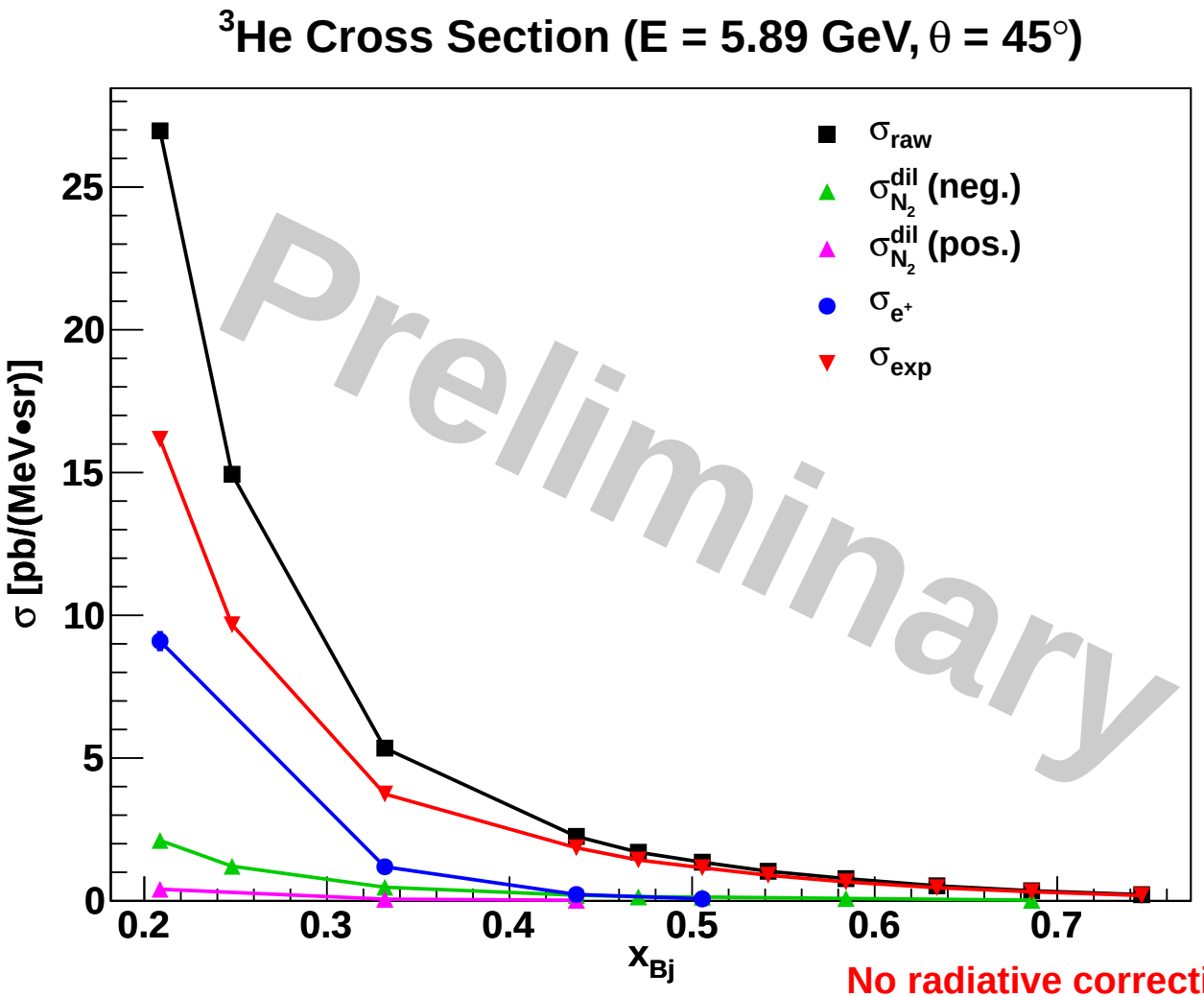
Updated Spectra (1)

E = 4.73 GeV Data Set



Updated Spectra (2)

E = 5.89 GeV Data Set

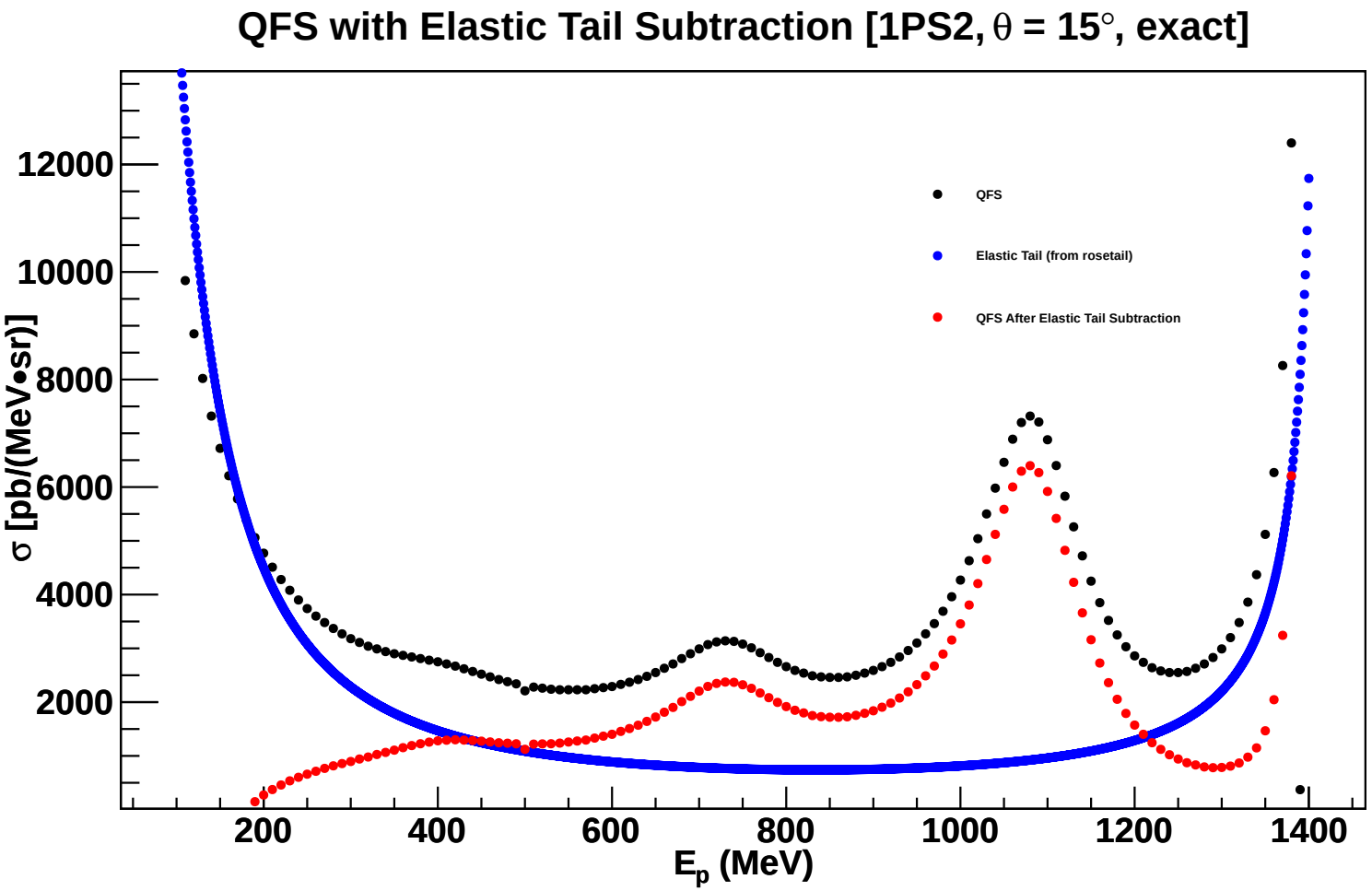


Sample Spectra

- Some definitions:
  1. $E_s =$ Incident electron energy
  2. $E_p =$ Scattered electron energy
- To test radcor, we consider ep scattering for a few different kinematics:
  - $\theta = 15^\circ$ and 45°
  - $E_s = 1.0, 1.5, 2.0$ and 2.5 GeV
- Review of the procedure:
  1. Radiate QFS to obtain each spectra
  2. Subtract off the elastic tail (obtained from `rosetail.f`)
  3. Input these spectra into the `radcor.f` code to unfold σ_{Born} for each of our data sets

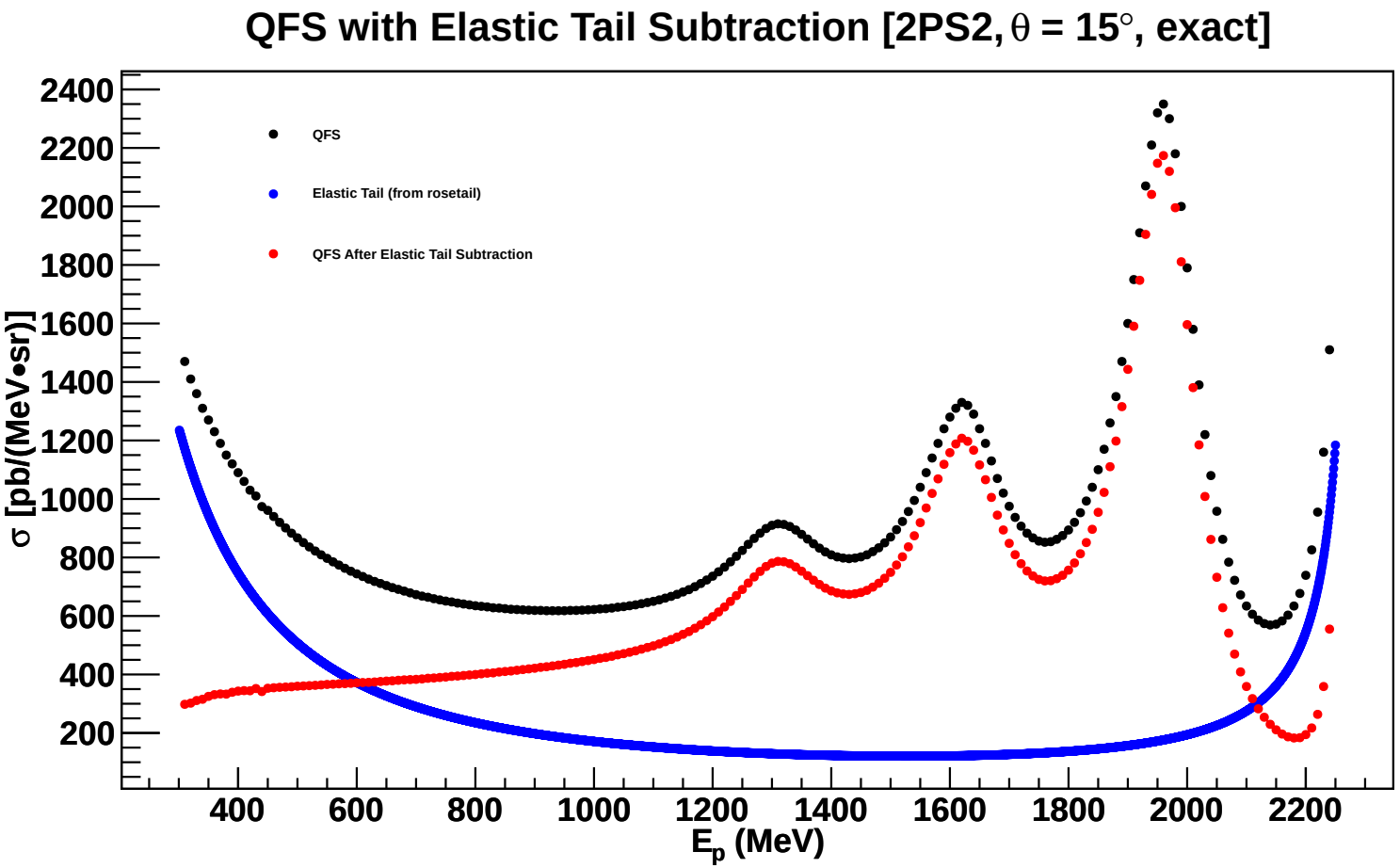
Subtracting the Elastic Radiative Tail (1)

$E_s = 1500\,\text{MeV}, \theta = 15^\circ$



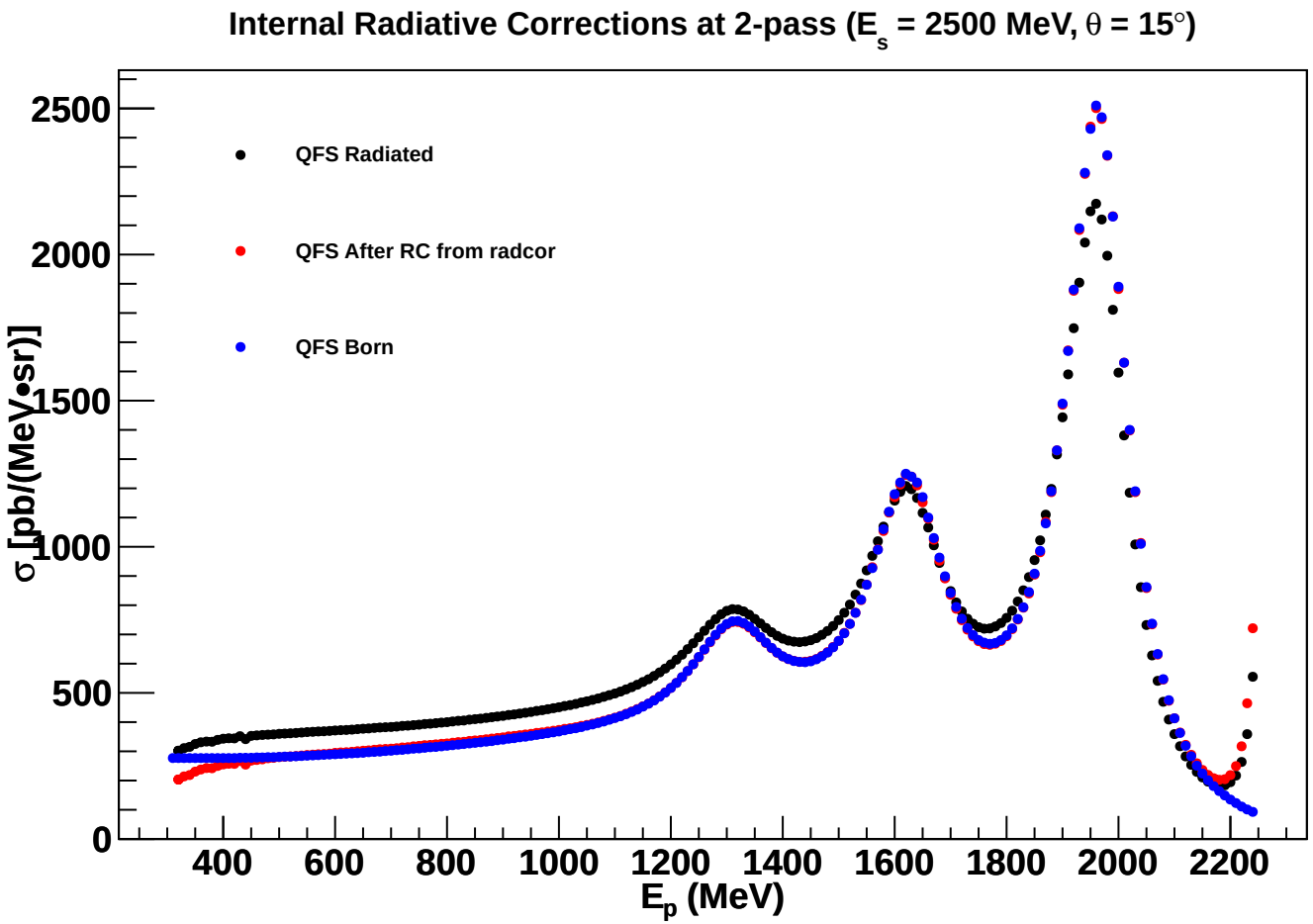
Subtracting the Elastic Radiative Tail (2)

$E_s = 2500$ MeV, $\theta = 15^\circ$



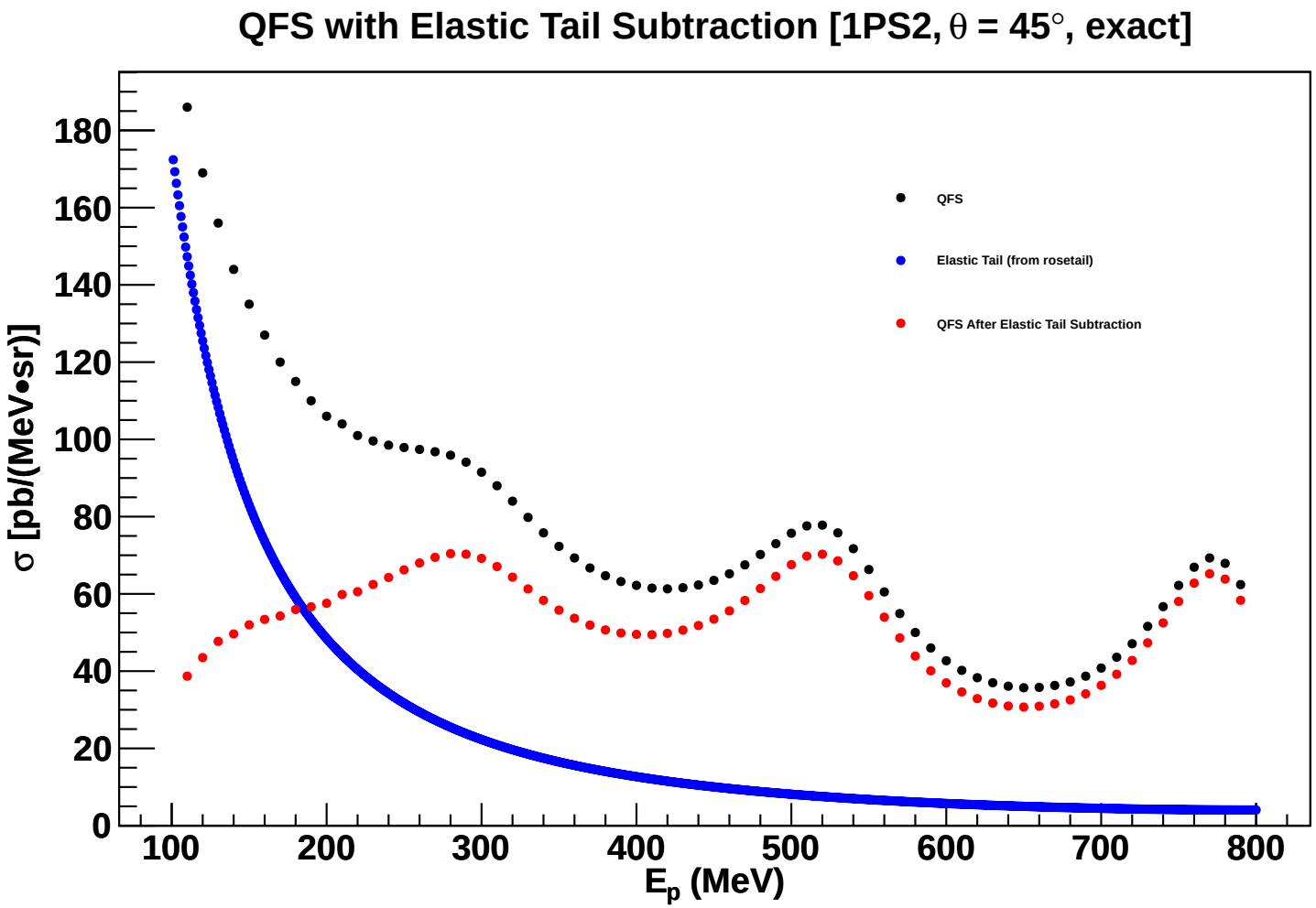
Unfolded Result

$E_s = 2500\ \text{MeV}, \theta = 15^\circ$



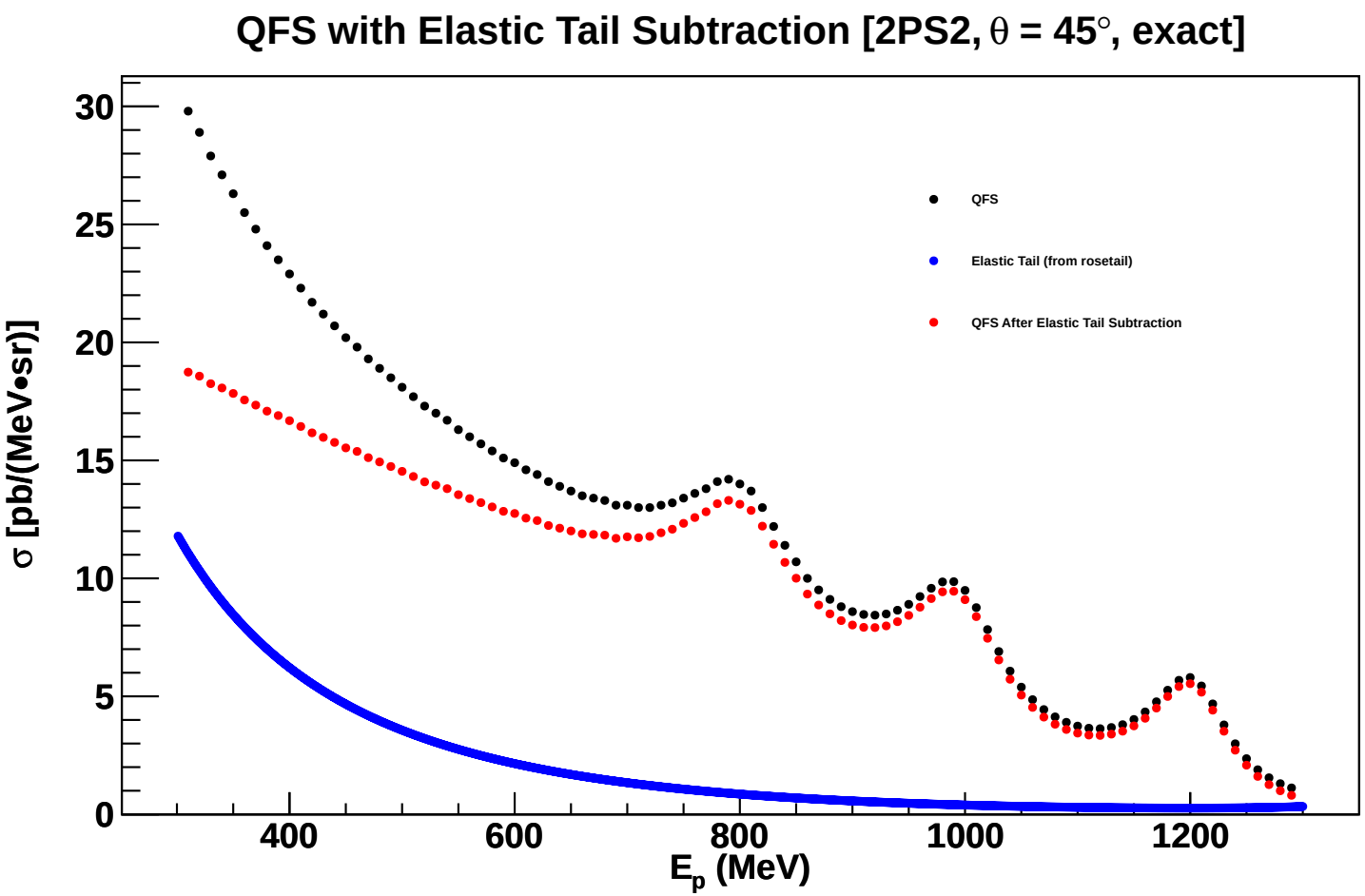
Subtracting the Elastic Radiative Tail (1)

$E_s = 1500\,\text{MeV}, \theta = 45^\circ$



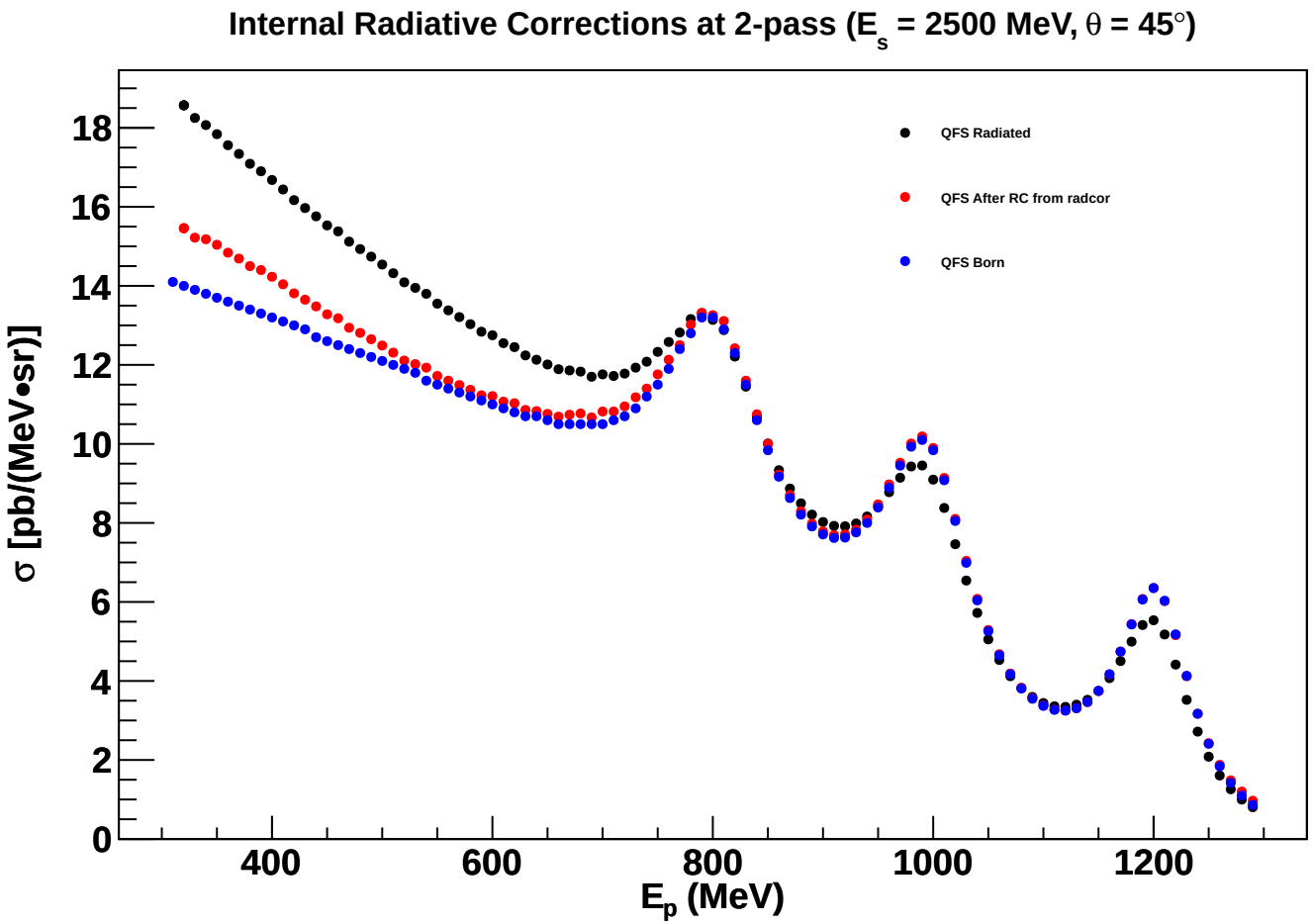
Subtracting the Elastic Radiative Tail (2)

$E_s = 2500\,\text{MeV}, \theta = 45^\circ$



Unfolded Result

$E_s = 2500$ MeV, $\theta = 45^\circ$



Summary

- Cross sections:
  - Backgrounds have been subtracted to obtain σ_{exp} at all E_p using the fit of $f(x) = e^{(a_0+a_1x)}/x^2$ to each spectrum
- Radiative corrections:
  - radcor works well for intermediate E_p for ep scattering
    - Smaller than 1% percent difference with the Born result from QFS
  - At low E_p, disagreement is $\sim$ 15–20% for $\theta = 15^\circ$ and $\sim 5\%$ at $\theta = 45^\circ$

What's Next?

- Radiative Corrections:
  - Investigate disagreement of elastic tail from rosetail with QFS curve at low E_p
  - Obtain corrections for ^{3}He in our kinematic range
  - Determine model for corrected cross section data using QFS (as input to `radcor.f`)
- I will not be here next week (PANIC), and the second week of August (7^{th}–14^{th})