

LHRS Analysis for d_2^n

Radiative Corrections: Resonances and Their Tails

D. Flay

2/2/12

Radiative Corrections

Structure in Unfolded
Spectra

Evaluating the Tails of
Subprocesses

Summary

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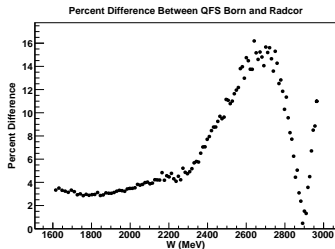
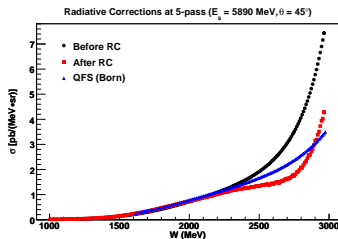
Structure in Unfolded Spectra (1)

Where Does it Come From?

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- ▶ Unfolded results from RADCOR do not agree with the Born cross section found in QFS at d_2^n kinematics (disagreement to $\sim 20\%$ in the DIS region):



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Structure in Unfolded
Spectra

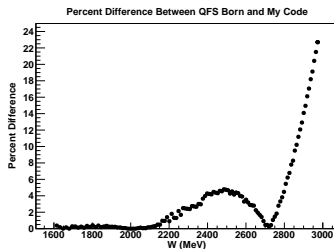
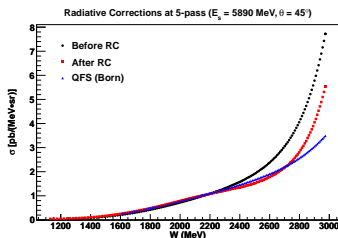
Evaluating the Tails of
Subprocesses

Summary

Structure in Unfolded Spectra (2)

Where Does it Come From?

- ▶ Is it an artifact of the code's interpolation method, or is it due to the contribution of the various subprocesses (QE, 2N, Δ , etc.)?
- ▶ The spectrum for $E_s = 1500$ MeV has the most structure. If we **remove** it from the input data (just a test!):



Evaluating Tails of Subprocesses (1)

5/11

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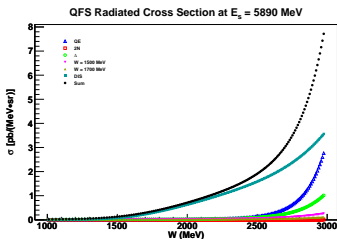
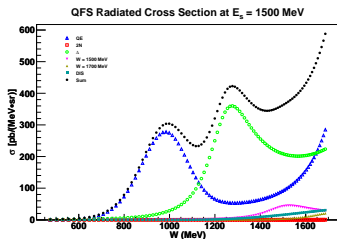
- ▶ We cannot ignore a small chunk of the phase space as in the previous slide
- ▶ We **can** approach the situation by breaking down each (input) spectrum into its various subprocesses:

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Structure in Unfolded
Spectra

Evaluating the Tails of
Subprocesses

Summary



Evaluating Tails of Subprocesses (2)

Method

- ▶ Since the tails of all subprocesses affect all W bins in the data, we can **subtract** these calculated tails off from each data set, much like what is done in the case of the **elastic tail**
 - ▶ After this is done for each input spectrum, we then run the radiative corrections
- ▶ This process is carried out for the QE and Δ tails

Evaluating Tails of Subprocesses (3)

Subtracting Just the QE Tail

7/11

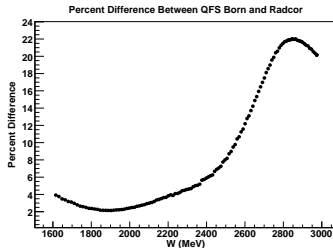
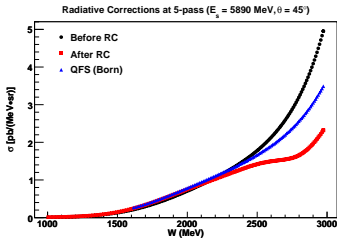
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Structure in Unfolded
Spectra

Evaluating the Tails of
Subprocesses

Summary



Evaluating Tails of Subprocesses (4)

Subtracting Just the Δ Tail

8/11

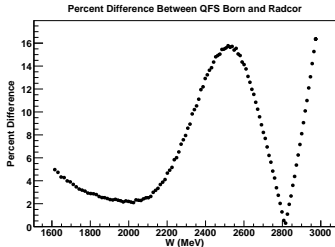
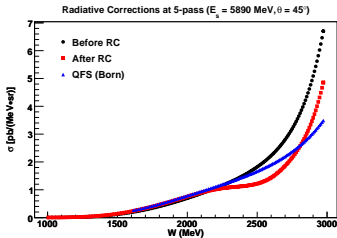
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Evaluating the Tails of
Subprocesses

Summary



Evaluating Tails of Subprocesses (5)

Subtracting Both QE and Δ Tails

9/11

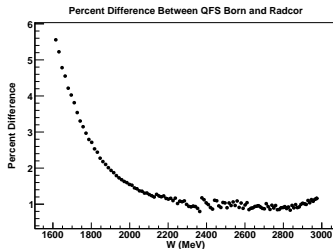
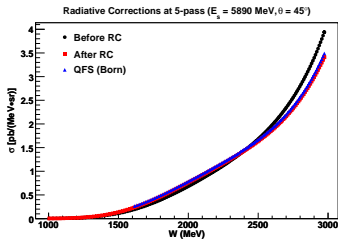
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Summary



- ▶ Structure in unfolded results from RADCOR is due to the structure of subprocesses clearly visible at lower E_s
- ▶ Treating the tails of such processes in a similar fashion to the elastic tail removes the structure seen in the unfolded result
- ▶ Same trend follows for 4-pass data as well

What's Next?

11/11

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- ▶ Check calculation of tails with other programs (ROSETAIL?) and account for $W = 1500, 1700$ MeV resonances
- ▶ Possibly revisit QFS fit – some structure present in that fit is certainly present here and would be nice to either fix or put an error on it
- ▶ C++ Code:
 - ▶ Investigate current interpolation method (and which constant should be used)
 - ▶ Track down discrepancy in the DIS region between RADCOR and the new C++ code (we're close...)
 - ▶ Implement a convergence check (was **not** actually present in RADCOR)

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