Building Polarized Cross Section Differences From Models

Analysis for d_2^n

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Outline

Asymmetries From Models

Review of Equations

- First build A_1 and A_2:

$$
\begin{aligned}
A_1 &= \frac{g_1 - \gamma^2 g_2}{F_1} \\
A_2 &= \gamma \frac{g_1 + g_2}{F_1} \\
\gamma &= \frac{2Mx}{\sqrt{Q^2}}
\end{aligned}
$$

- Note: $g_2 = g_2^{WW}$ here
- Utilize DSSV for models of polarized PDFs
- Utilize F1F209, CTEQ for unpolarized SFs
- Utilize the SLAC E143 fit for $R(x,Q^2)$

$\Delta\sigma$ From Models (1)

From Asymmetries to $\Delta\sigma$

1. The parallel and perpendicular asymmetries are given by:

$$\begin{aligned} A_{\parallel} &= D\left(A_1 + \eta A_2\right) \\ A_{\perp} &= d\left(A_1 - \xi A_2\right) \end{aligned}$$

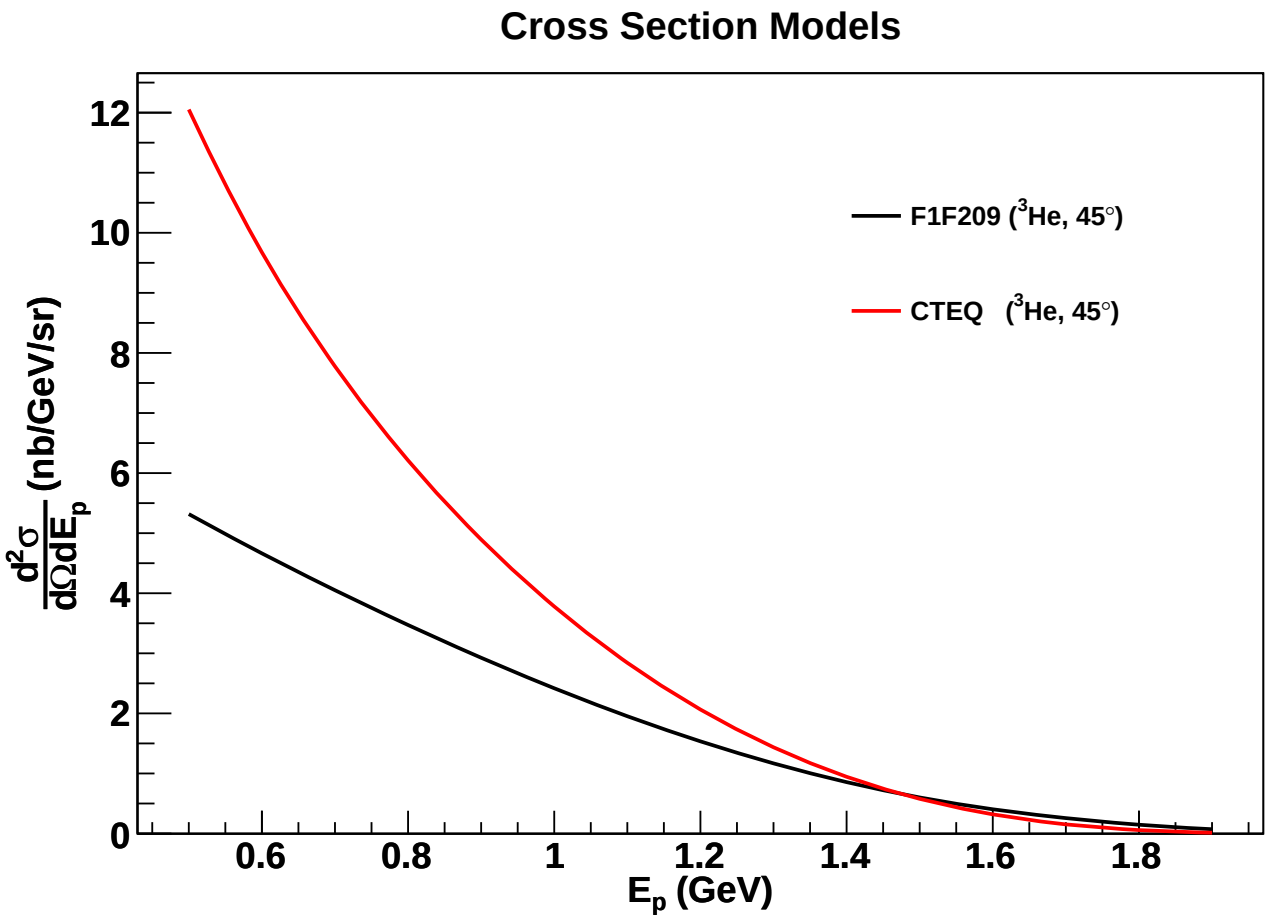
   D, η, ξ and d are kinematic factors

2. Form the polarized cross section differences:

$$\Delta\sigma_{\parallel,\perp} = 2\sigma_0 A_{\parallel,\perp}$$

$\Delta\sigma$ From Models (2)

Unpolarized Born Cross Section Models



$\Delta\sigma$ From Models (3)

Longitudinal

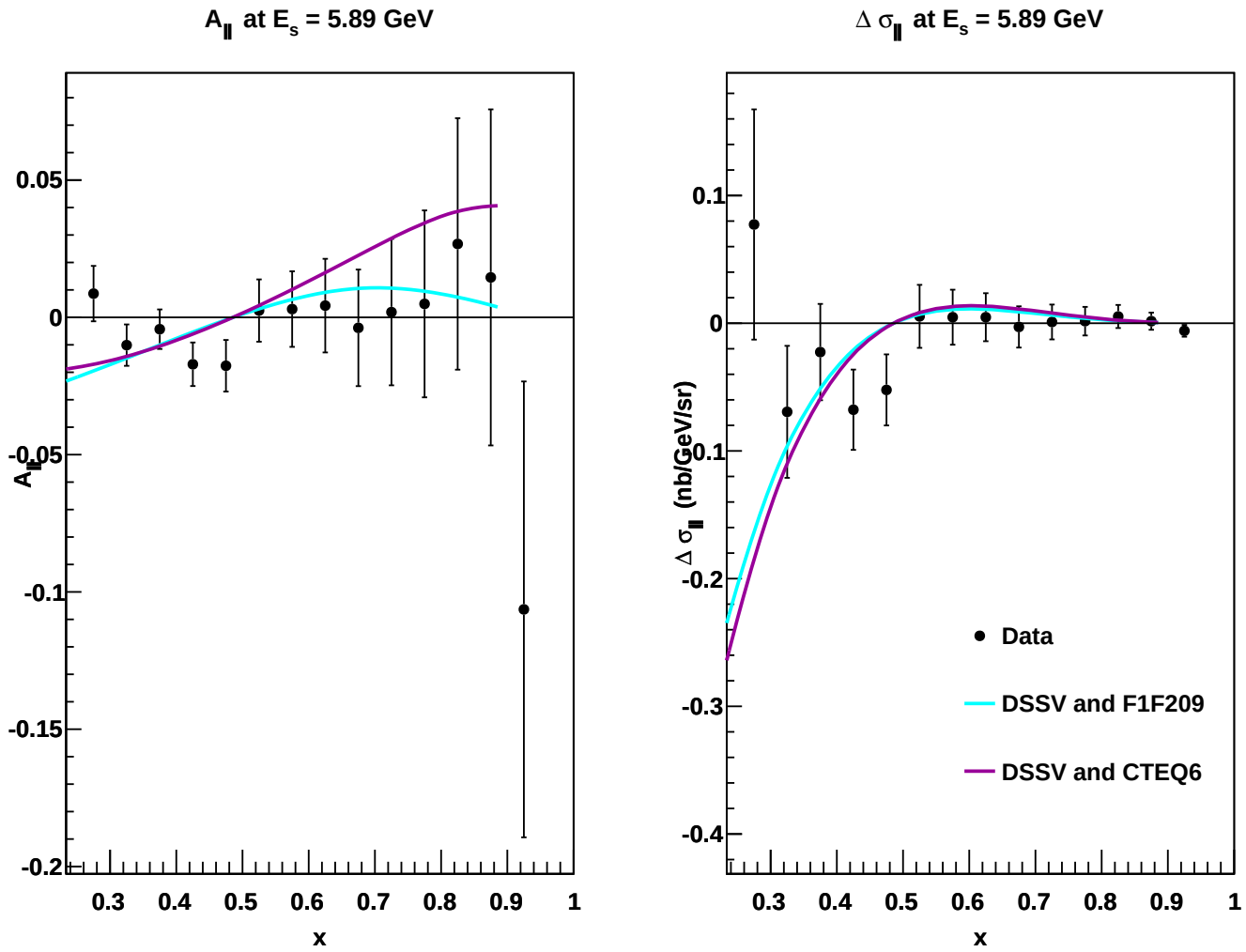


Figure: Note that the model is Born

$\Delta\sigma$ From Models (4)

Transverse

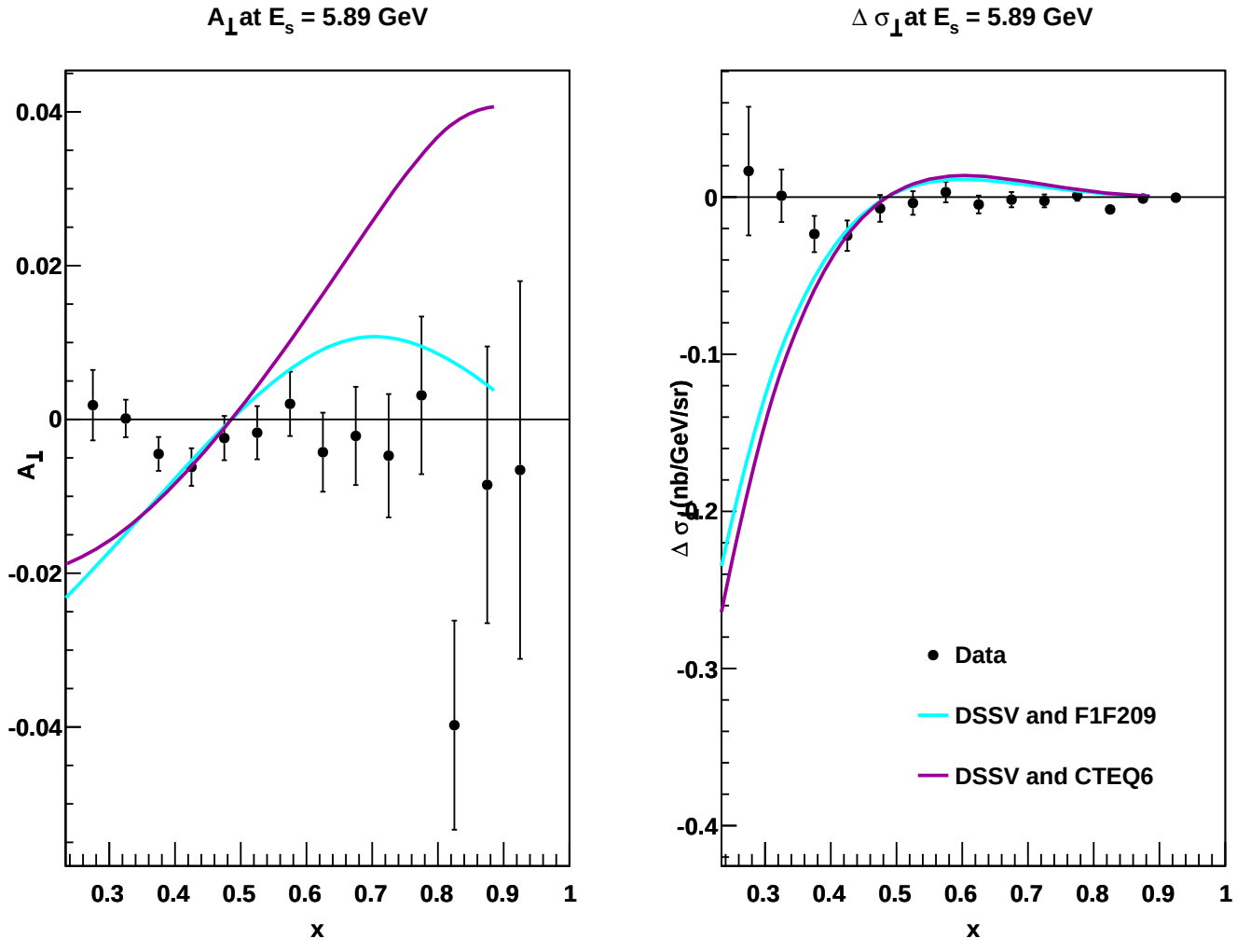


Figure: Note that the model is Born

Summary

- Using the InSANE libraries, we can construct (Born) models for $A_{\parallel,\perp}$ and $\sigma_{\parallel,\perp}$
  - Note that these models are evaluated for varying x and Q^2
- Scripts have been written to generate the entire integration phase space for 4- and 5-pass data

What's Next?

- Radiative corrections to asymmetries
  - InSANE: Continue work on cross section classes (currently only 'functional' for F1F209, CTEQ)
  - Investigate polarized elastic and quasi-elastic tails
  - Generate the input files for RADCOR (most of the code has been written)
  - Do RCs using RADCOR

Appendix

Phase Space for Radiative Corrections

- If we use DSSV as the basis for A_1 and A_2, the reach in (E_s,E_p) is constrained