SIDIS Group Update

Anselm Vossen (Duke & JLAB)

Marco Radici (Pavia)

Impact Plots Candidates

Athena fast simulations w/ beam crossing effects (Duane Byer (Duke))

- SIDIS coverage → Emphasize unexplored phase space

- Sivers & TMD Evolution → Golden Channel, high impact of Athena data

- Transversity →Silver measurement

- Sea quark helicities → Golden measurements, highlight PID

- Suppression in eA →Golden channel, highlight acceptance
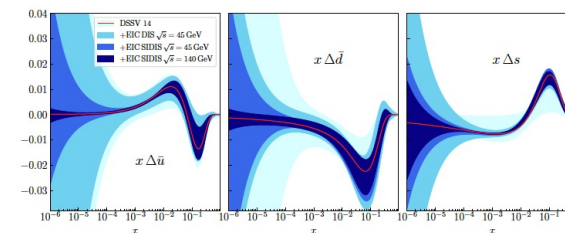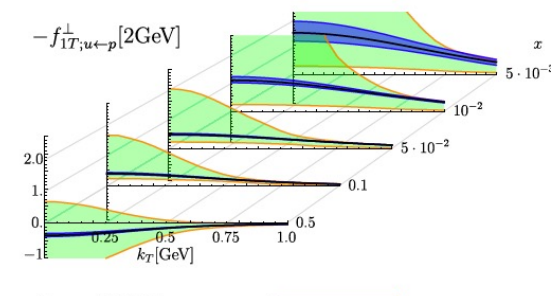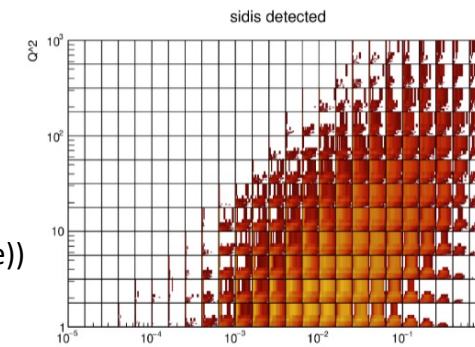
Figure 7.19: Impact of SIDIS measurements at the EIC on the sea quark helicities $x\Delta u$, $x\Delta \bar{d}$ and $x\Delta s$ as a function of x at $Q^2 = 10\,\mathrm{GeV}^2$.
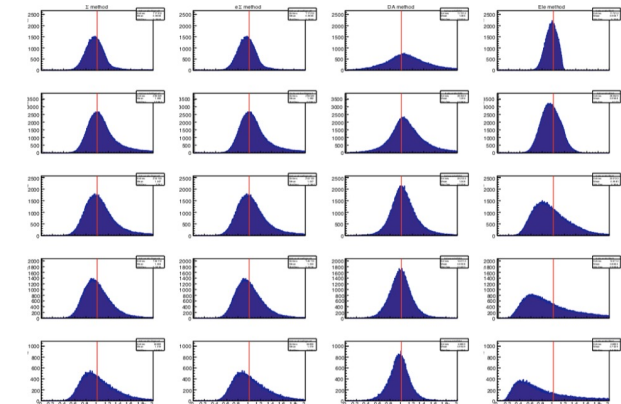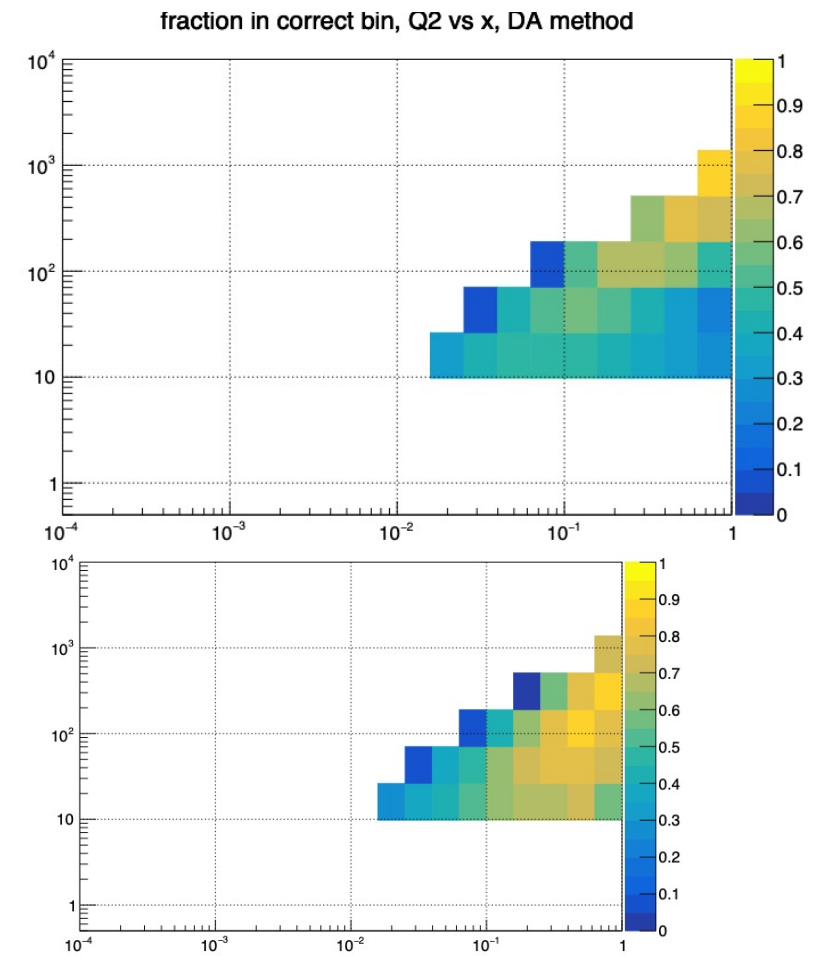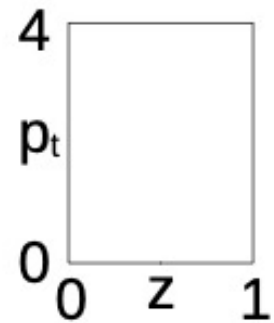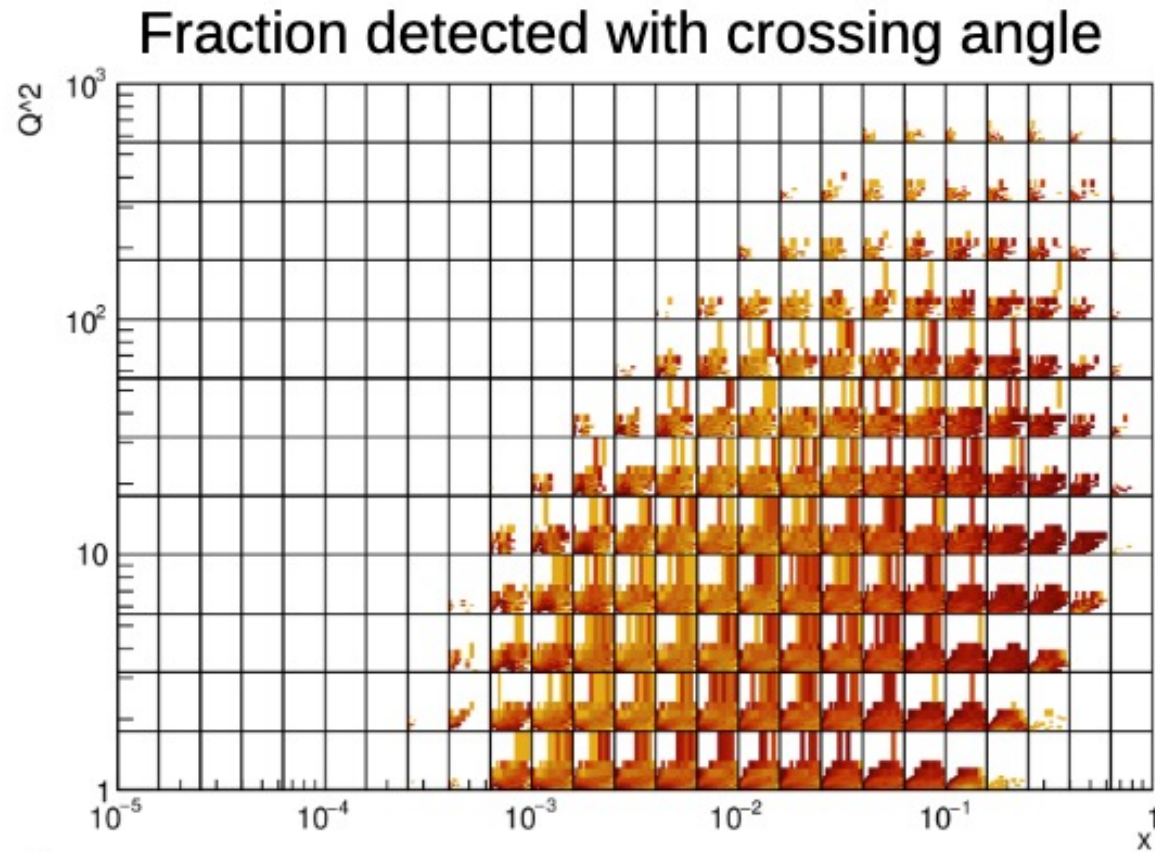
- (Λ program)

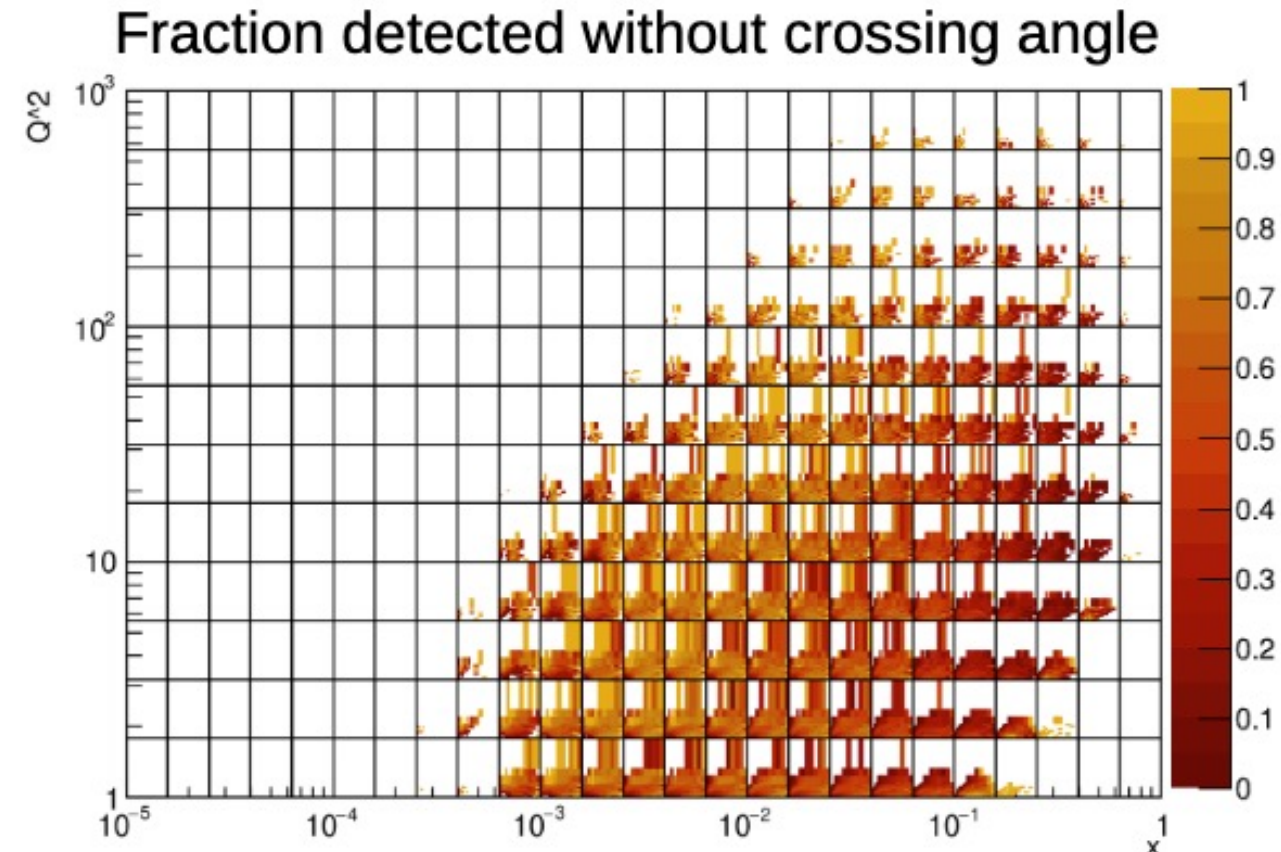# News & Progress

- Studies of kinematics with fast simulations
  - Reconstruction of SIDIS variables with electron and hadronic methods
  - Impact of beam crossing on kinematics
    - Still need to evaluate impact on azimuthal asymmetries
  - Impact of PID ranges

- First pseudodata for azimuthal asymmetries on track to be generate within ~2 weeks

fraction in correct bin, Q2 vs x, DA method

With/without crossing angle

Fraction detected with crossing angle

Fraction detected without crossing angle

Overall 23.1% events detected

Overall 22.7% events detected

$$Q^2 > 1 \text{ GeV}^2 \quad 0.01 < y < 0.95 \quad W^2 > 10 \text{ GeV}^2$$

5

From Duane Byer

Systematics Discussion

- Productive meeting with ECCE conveners (Ralf Seidl, Charlotte van Hulse)

- Main topics: Systematics due to detector acceptance, PID and interface with theory groups

- Proposal: base most acceptance/PID systematics on difference between model projections and extracted asymmetries (no unfolding, no variation between MC models)
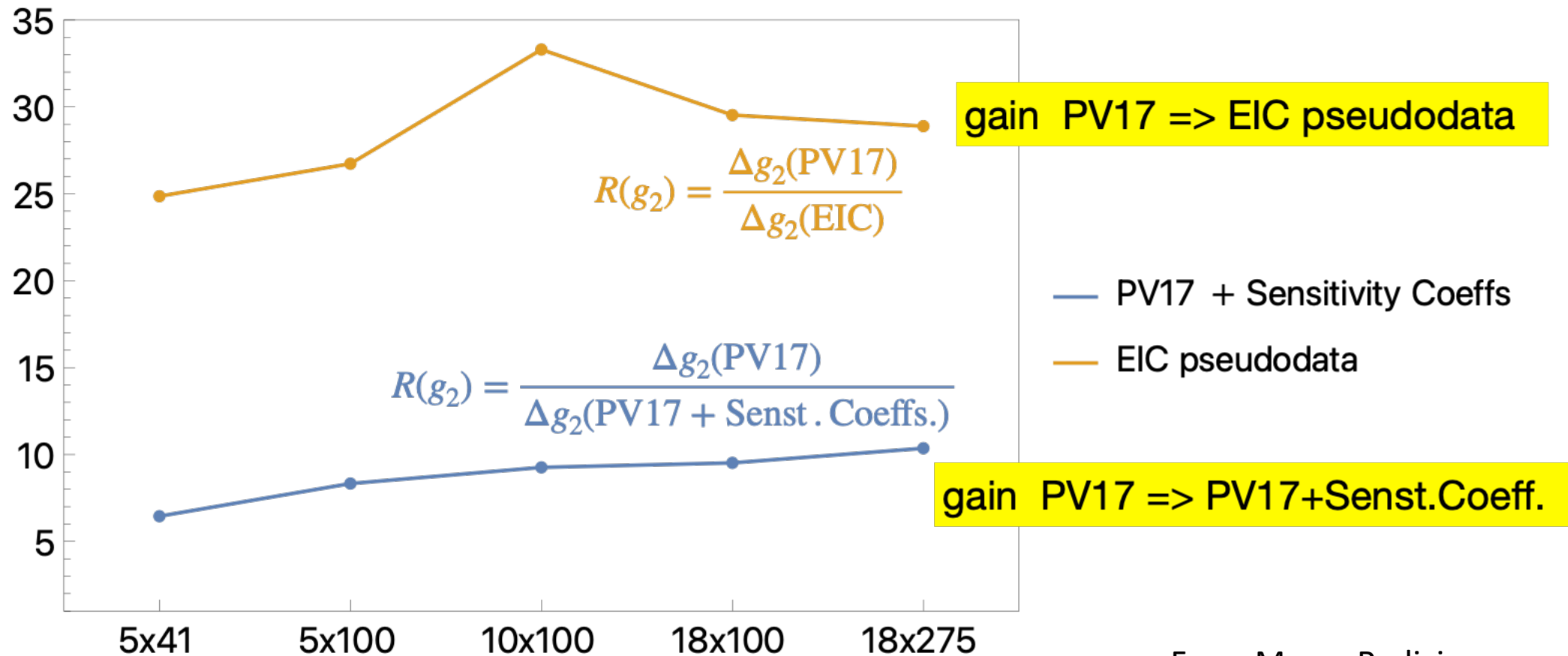
Lambda Studies

- Open question: What is the performance of the tracking for far removed vertices?

- Olga Evdokimov (UIC) + student started working on evaluation using standalone fun4all simulation

Progress on estimating impact of Athena measurements on TMDs → Pavia Upol Fit
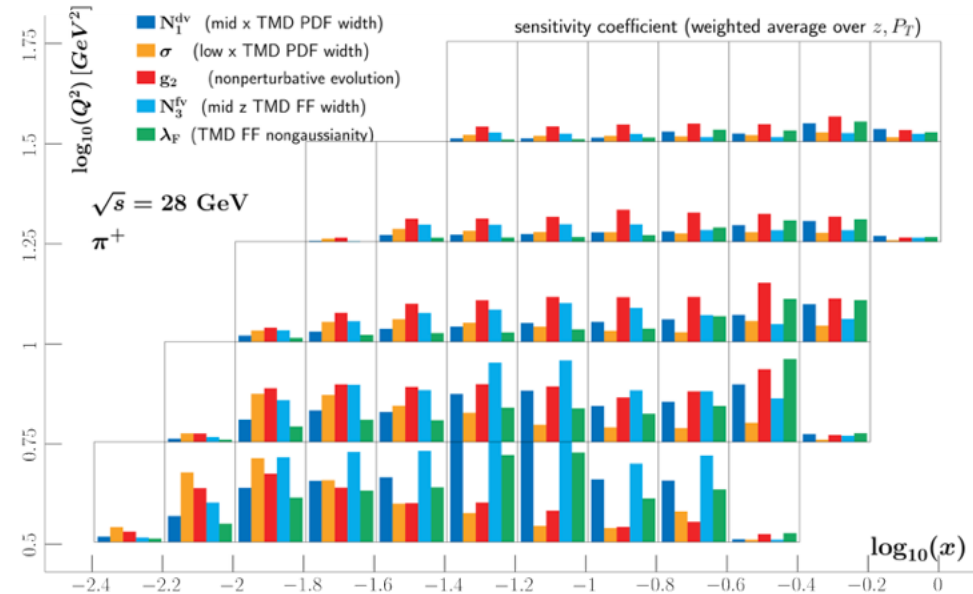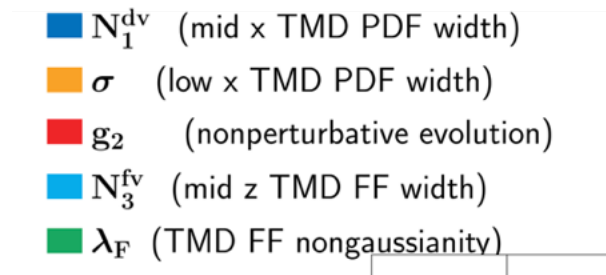
First estimation using pseudodata, comparison with sensitivity coefficients only

PV17 fit: 68% of replicas $\Delta g_2 = 0.01$

$$R(g_2) = \frac{\Delta g_2(\text{PV17})}{\Delta g_2(\text{EIC})}$$

gain PV17 => EIC pseudodata

—— PV17 + Sensitivity Coeffs

—— EIC pseudodata

$$R(g_2) = \frac{\Delta g_2(\text{PV17})}{\Delta g_2(\text{PV17} + \text{Senst. Coeffs.})}$$

gain PV17 => PV17+Senst.Coeff.

From Marco Radici

Readiness for full simulations

- Depends on the definition of "readiness"

- Members of the SIDIS group (Sangwha Park, SBU) started looking at full simulations

- Most SIDIS golden channels mainly need tracking+PID
  - Should be possible to study in a reasonable timescale
  - (Code sharing with fast simulation effort)

- However: SIDIS group severely workforce limited!

- Not clear if full simulations are absolutely necessary

What needs to happen

- Main issue is workforce
- Barely covering our bases right now
- By definition, many single fail points