Analysis Coordination Meeting

SIDIS Working Group

01 / 14 / 2025

S. Diehl (JLU Giessen and UConn)
R. Seidl (Riken)

Wiki of the SIDIS PWG: https://wiki.bnl.gov/EPIC/index.php?title=SIDIS

PWG meetings: Tuesday 2.30 pm (~ every 2 weeks)
next meeting: 01/28/2025

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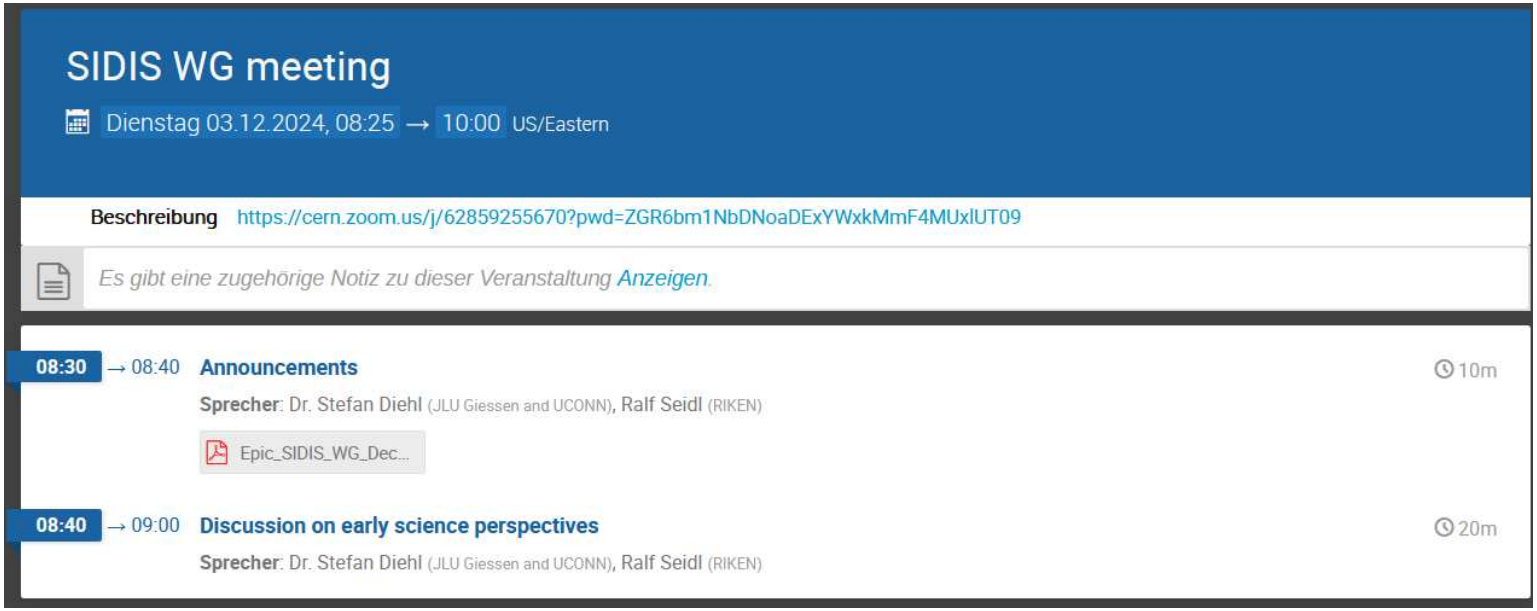


SIDIS WG meeting

Dienstag 03.12.2024, 08:25 → 10:00 US/Eastern

Beschreibung https://cern.zoom.us/j/62859255670?pwd=ZGR6bm1NbDNoaDExYWxkMmF4MUxlUT09

Es gibt eine zugehörige Notiz zu dieser Veranstaltung Anzeigen.

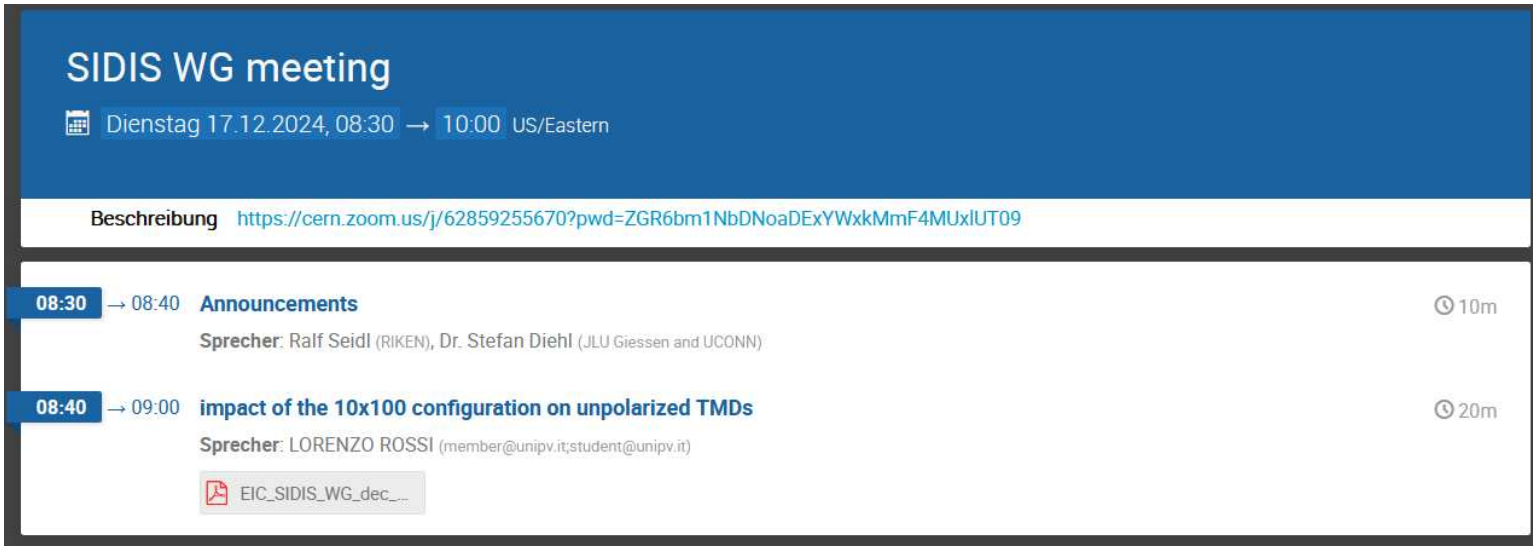
08:30 → 08:40 **Announcements** 10m

Sprecher: Dr. Stefan Diehl (JLU Giessen and UCONN), Ralf Seidl (RIKEN)

Epic_SIDIS_WG_Dec...

08:40 → 09:00 **Discussion on early science perspectives** 20m

Sprecher: Dr. Stefan Diehl (JLU Giessen and UCONN), Ralf Seidl (RIKEN)



SIDIS WG meeting

Dienstag 17.12.2024, 08:30 → 10:00 US/Eastern

Beschreibung https://cern.zoom.us/j/62859255670?pwd=ZGR6bm1NbDNoaDExYWxkMmF4MUxlUT09

08:30 → 08:40 **Announcements** 10m

Sprecher: Ralf Seidl (RIKEN), Dr. Stefan Diehl (JLU Giessen and UCONN)

08:40 → 09:00 **impact of the 10x100 configuration on unpolarized TMDs** 20m

Sprecher: LORENZO ROSSI (member@unipv.it;student@unipv.it)

EIC_SIDIS_WG_dec_...

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Next SIDIS WG meeting on January 28th: Contribution of Italian INFN groups

➔ Several Italien groups (from INFN) will join the SIDIS activities

Simulations:

• We are still waiting for the e+n pull request

Data Inputs and Requirements for Physics Analysis:

- Pythia8 simulation output at the defined enegies
- Statistics should match the expected data

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L. Rossi
M. Radici
G. Matousek

Projections for unpolarized TMDs:

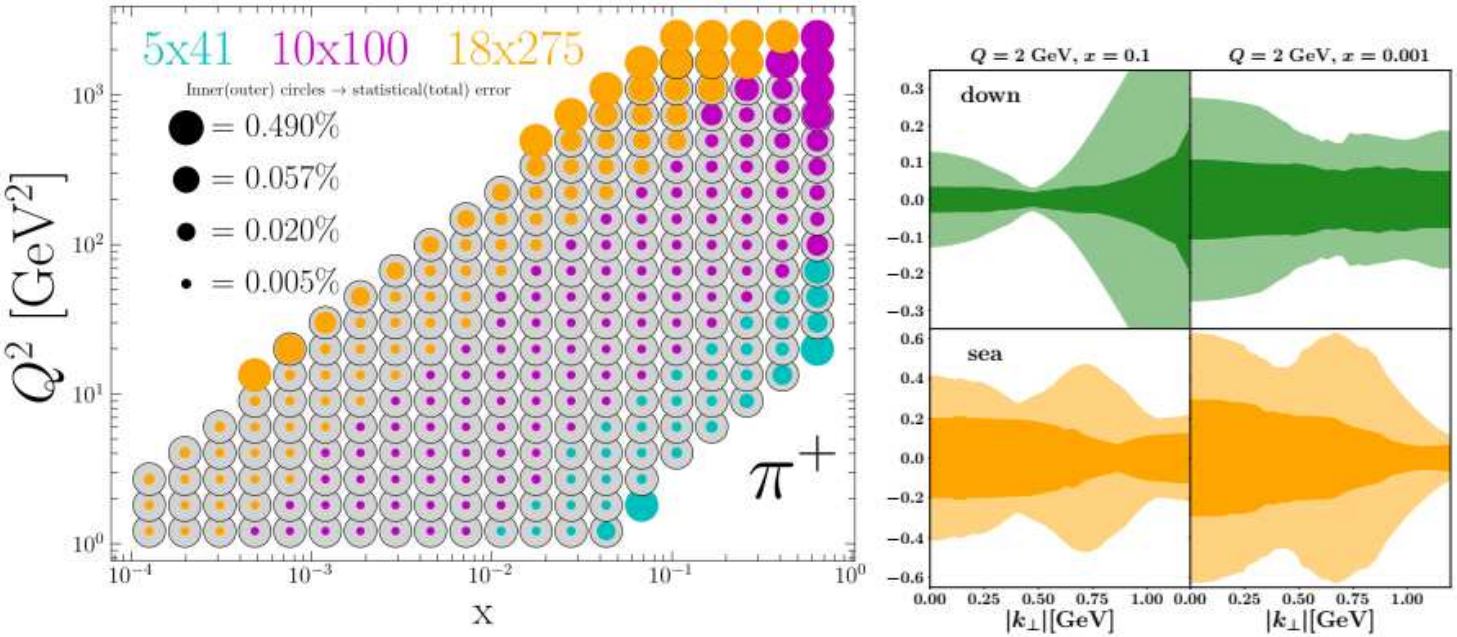

Figure 2.8: Left: Expected statistical and total uncertainty of un-polarized TMD PDFs for π^+ in the $Q^2 - x_B$ plane. The inner (colored) circle shows the statistical uncertainty, while the outer circle provides the total uncertainty for each $Q^2 - x_B$ bin. The color shows the beam energy configuration which provides the highest statistics in a specific bin. Right panel: Expected uncertainties of valence down (green) and sea quark (orange) TMD PDFs at $x = 0.1$ (left) and $x = 0.001$ (right) as obtained based on the MAP24 [1] global TMD fit. The lighter shaded regions show the uncertainties based on existing data while the darker shaded regions show the expected uncertainties after including ePIC data.

➔ Further stduies, also including Kaon data are ongoing / planed

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Projections of A_{UT}:

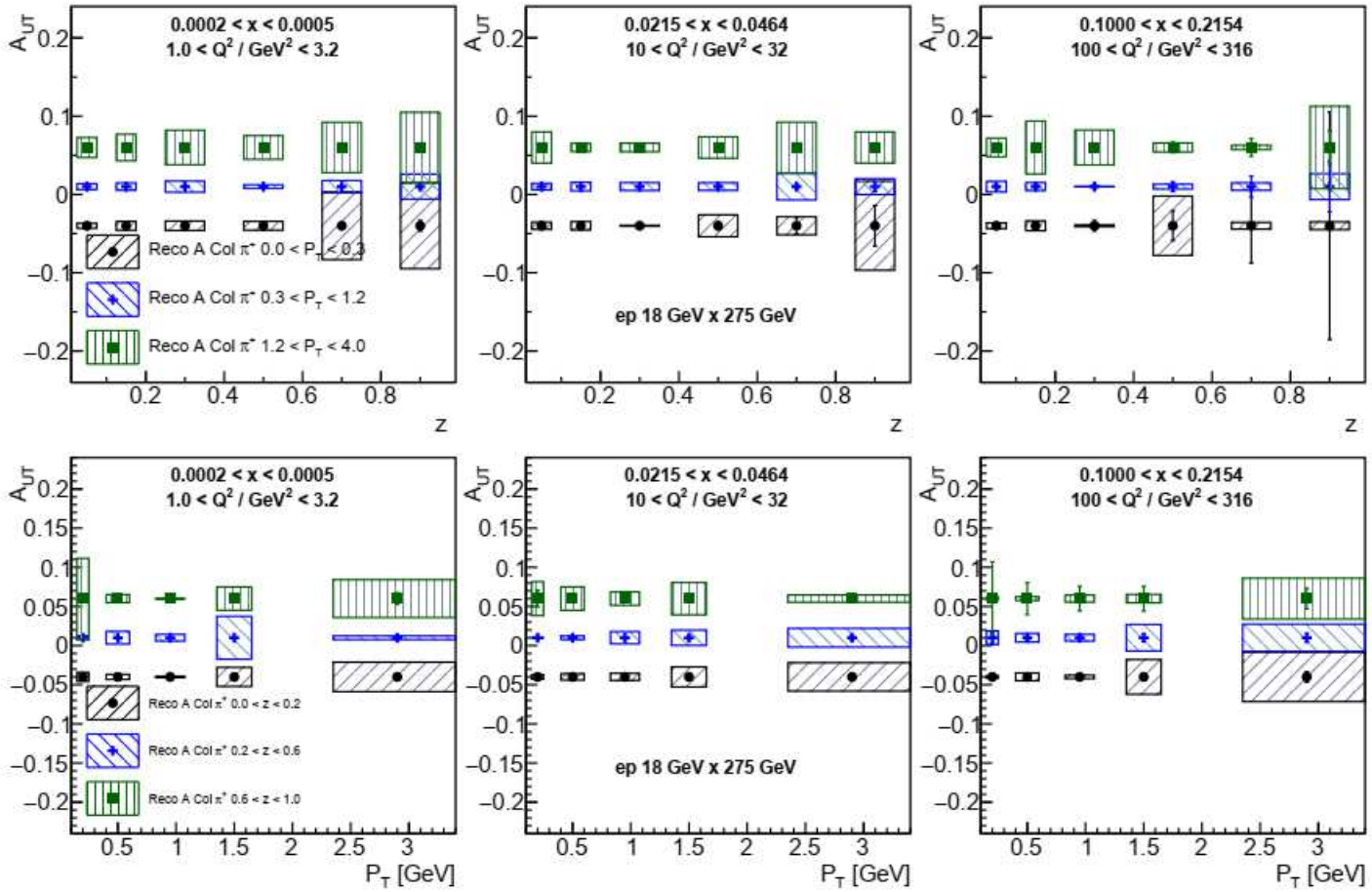

Figure 2.9: Top: Expected uncertainties in three example x-Q^2 bins for the Collins asymmetries for positive pions as a function of the momentum fraction z and in three bins of hadron transverse momentum relative to the virtual photon direction assuming a luminosity of 10 fb^{-1}. Bottom, the same but as a function of the hadron transverse momentum in bins of z.

R. Seidl

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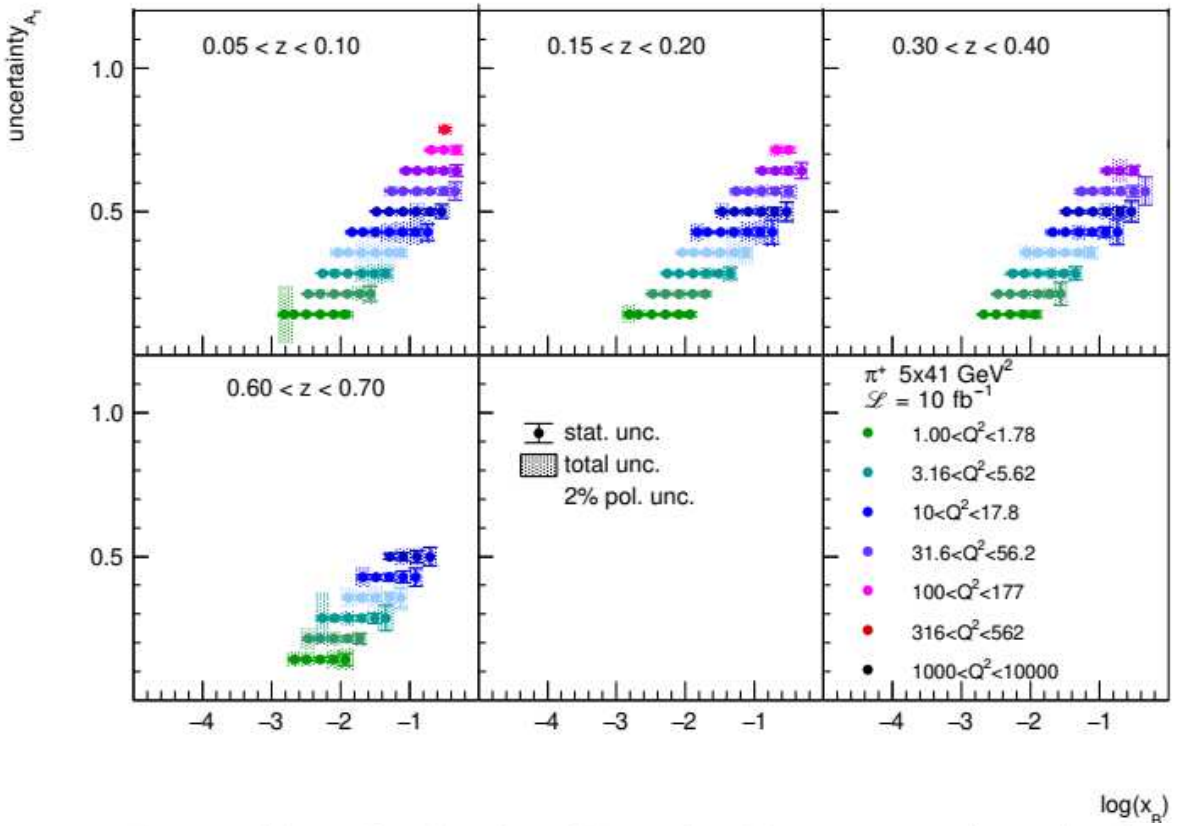
Projections for A_{LL}:



C. van Hulse

Figure 2.7: Statistical (error bars) and total (error bands) uncertainty for each selected bins in x_B and Q^2 and for selected ranges in z, for positive-pion A_1 asymmetries at 5×41 GeV^2 (top two rows) and 18×275 GeV^2 (bottom two rows). An additional global scale uncertainty of 2% accounts for the uncertainty in the beam polarizations, as indicated in the figure. The central value on the vertical axis of the data points has no meaning.

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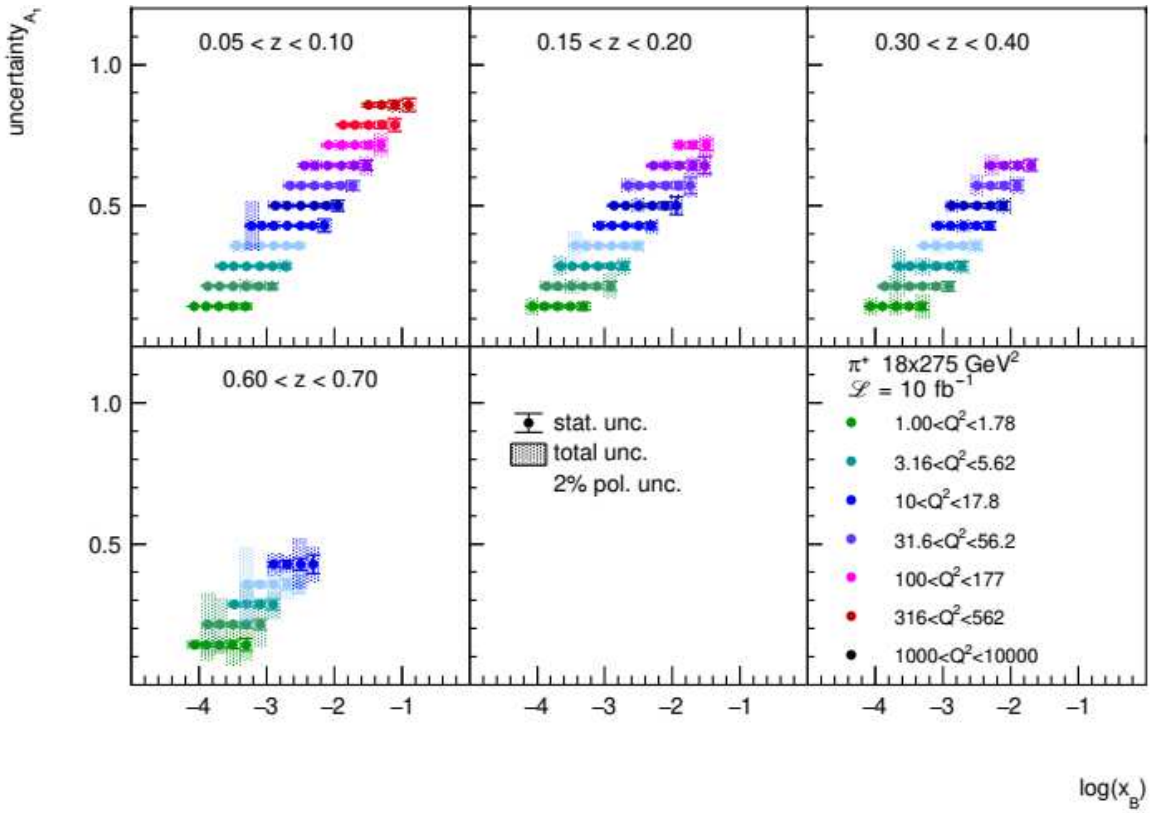
Projections for A_{LL}:

C. Van Hulse



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EIC Early Science

➔ **Perspective for year 1:** [10 GeV elec. on 115 GeV/u heavy ion (Ru or Cu)]

- Nuclear PDFs and nuclear FFs are poorly known in the EIC kinematic domain
  - ➔ Even with very low statistics (0.9 fb^{-1}), 1D (nPDF)/2D(nFF) studies would be usefull first results
  - ➔ Scale projection on eA from yellow report?

➔ **Perspective for year 2:** [10 GeV electrons on 130 GeV/u Deuterium]

- Proton and neutron PDFs and FFs can be studied, improvement on strange and d PDFs (based on deuterium target)?
- early unpol. TMD measurements (first look at TMD evolution?)

➔ **Perspective for year 3:** [transversely (linearly) polarized protons]

- SIDIS structure functions with target polarzation (depeding on luminosity): early look at A_{UT} asymmetries
- Early A_{LL} asymmetries?