Updates on SIDIS simulations and single-spin asymmetry projections

EIC Yellow Report SIDIS Meeting
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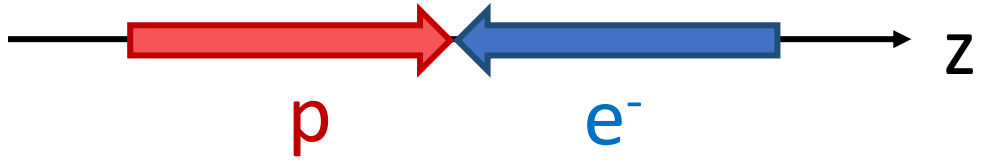
July 6, 2020

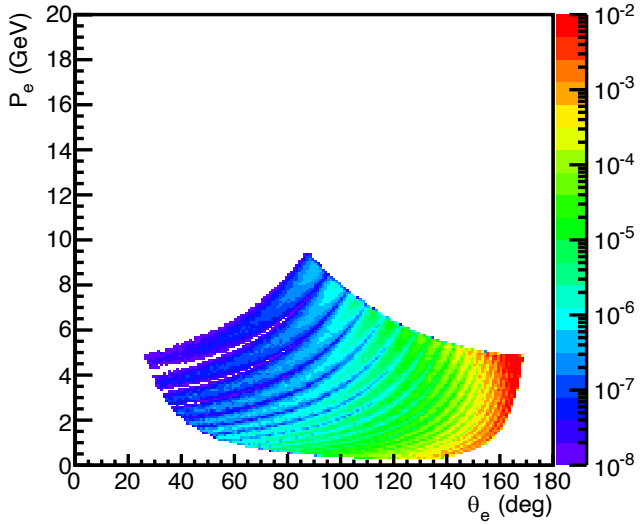
Overview of the simulation parameters

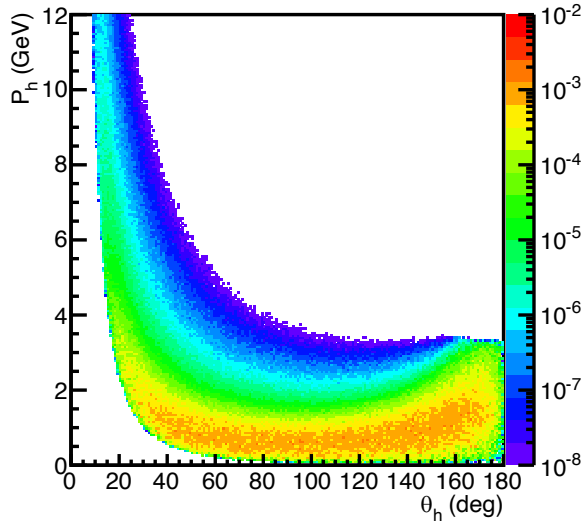
- SIDIS event generator: Pavia17 TMD fit implemented
- $E_e \times E_p$(GeV): 5 × 100, 10 × 100, 10 × 275
- Integrated luminosity: $1 \times 10^{41}\ cm^{-2}\ (100\ fb^{-1})$
- Cuts placed:
  - 0.05 < y < 0.95
  - $W^2 > 10\ GeV^2$
  - $|\eta| < 3.5$
- Polarization of proton beam = 80%
- e-p crossing angle = 0, small crossing angles to be studied
- Use eJana plugin *eic_smear, detector = handbook* for smearing

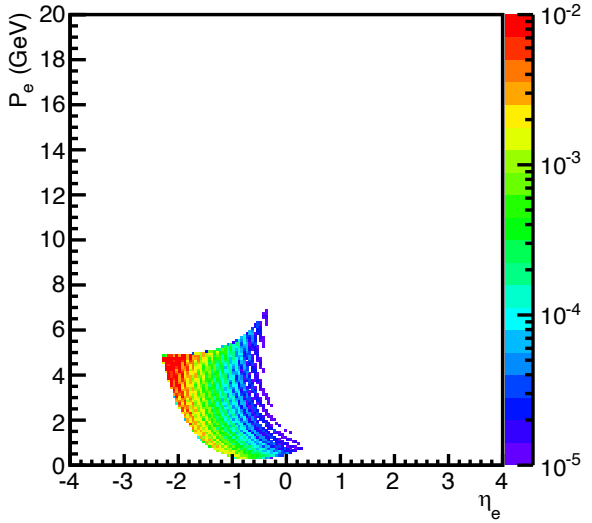
Kinematic distributions of scattered e^- and π^+

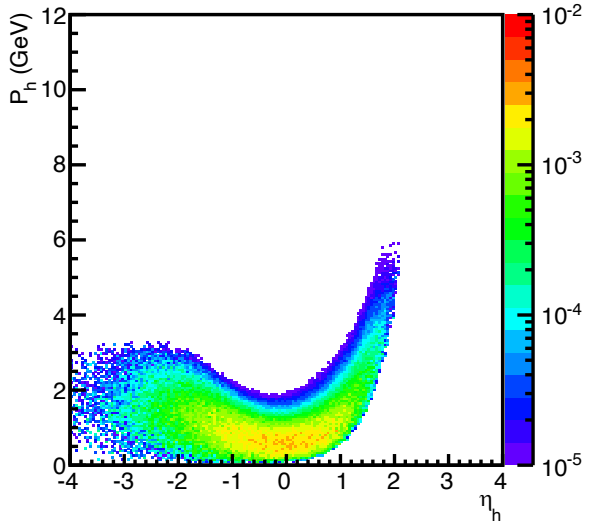
- e-p 5 x 100 GeV





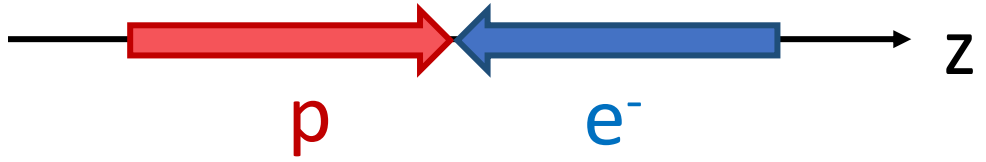


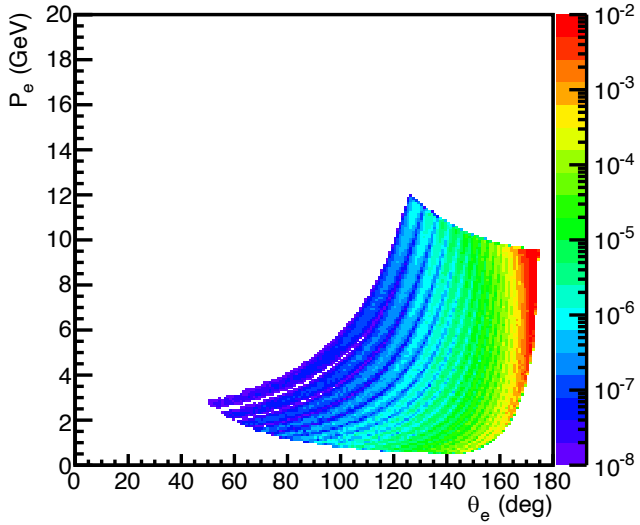


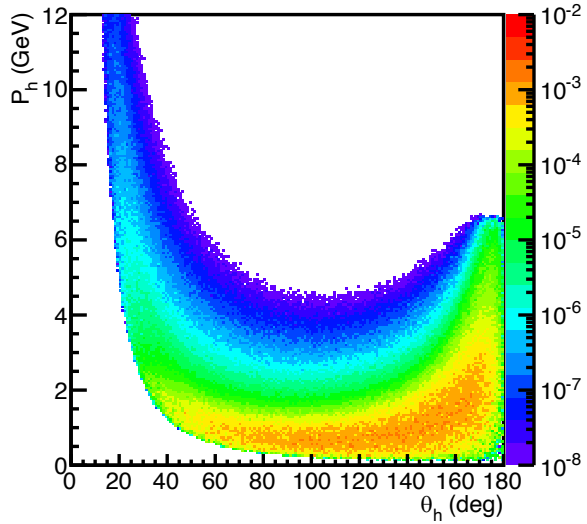


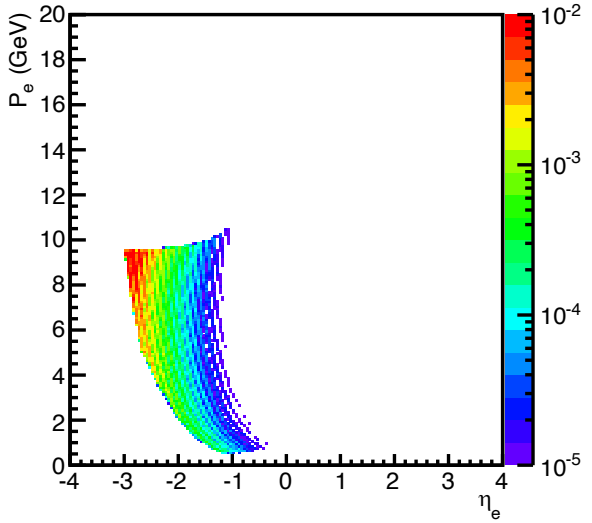
Kinematic distributions of scattered e^- and π^+

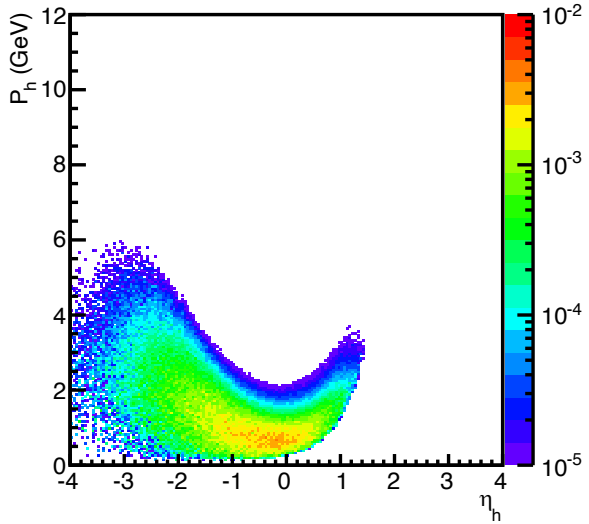
- e-p 10 x 100 GeV





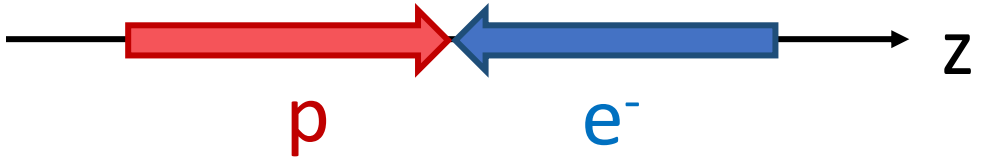


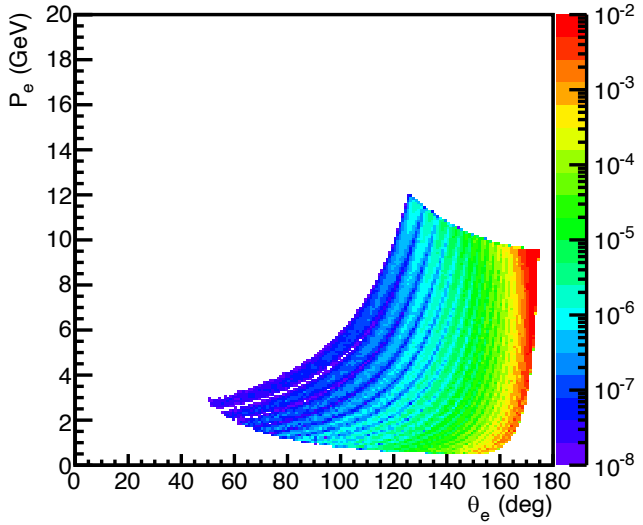


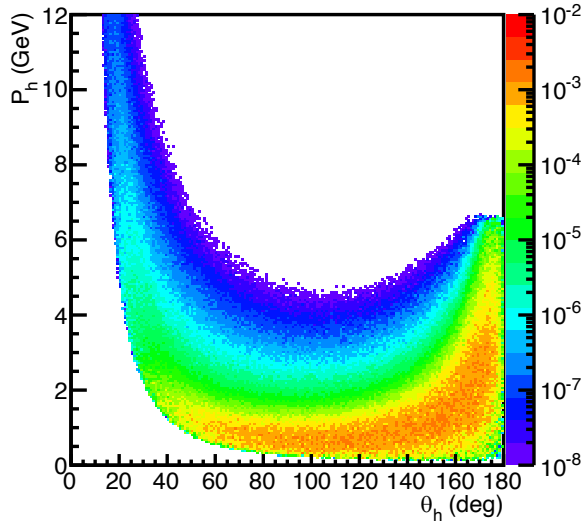


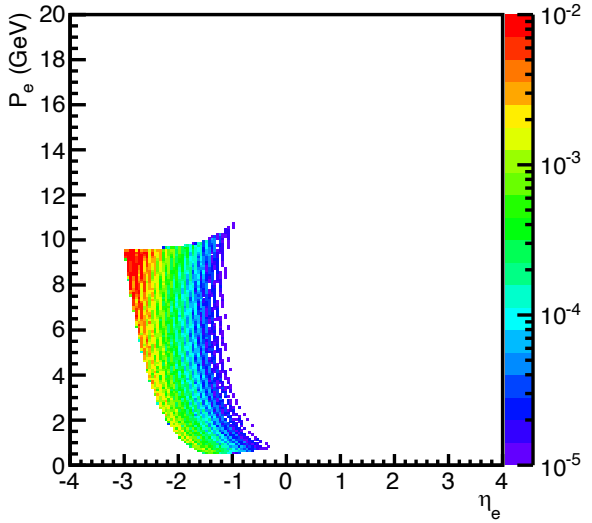
Kinematic distributions of scattered e^- and π^+

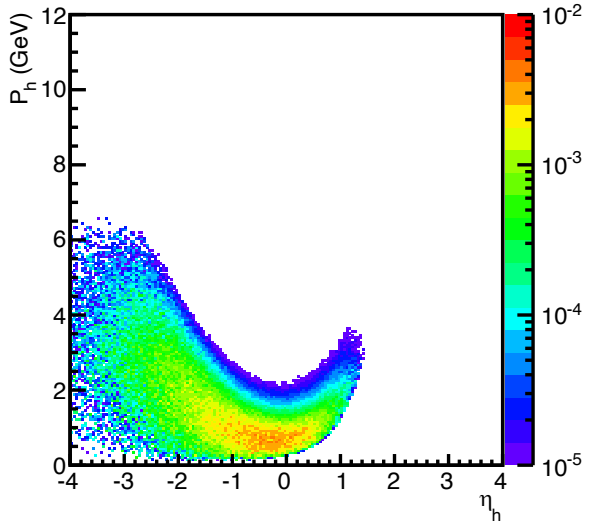
- e-p 10 x 275 GeV





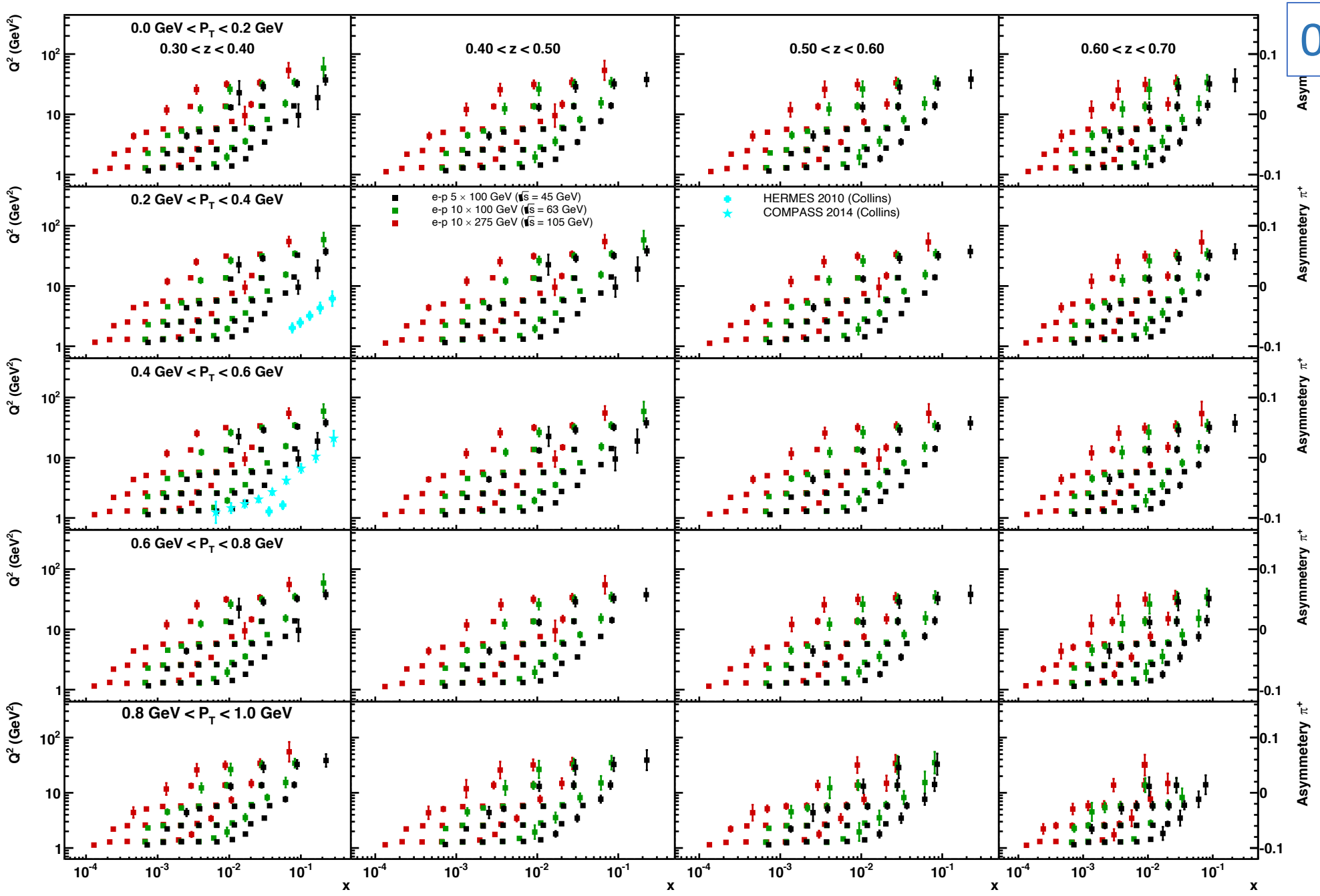






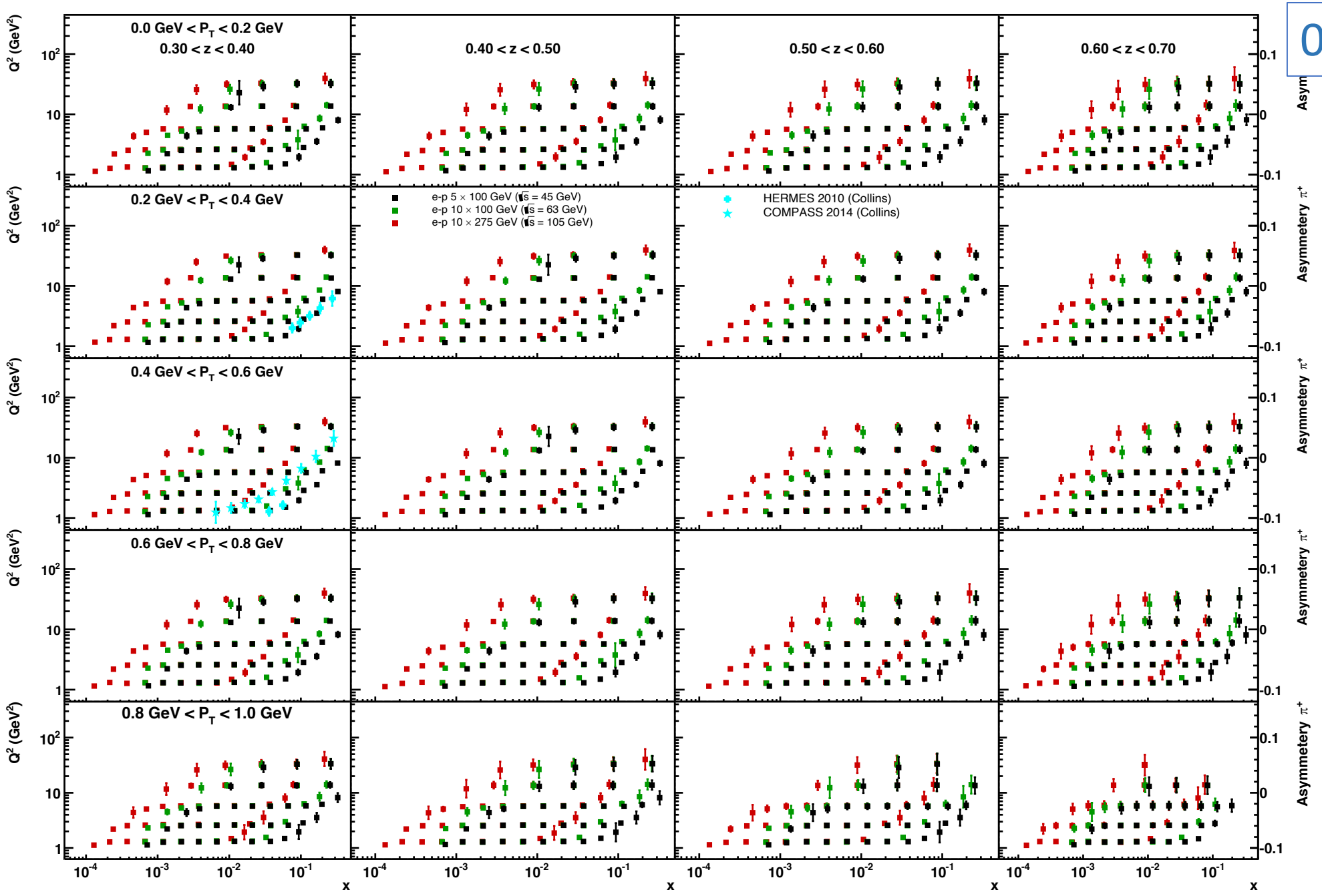
EIC SIDIS statistical projections on single spin asymmetry of π^+

$0.05 < y < 0.95$

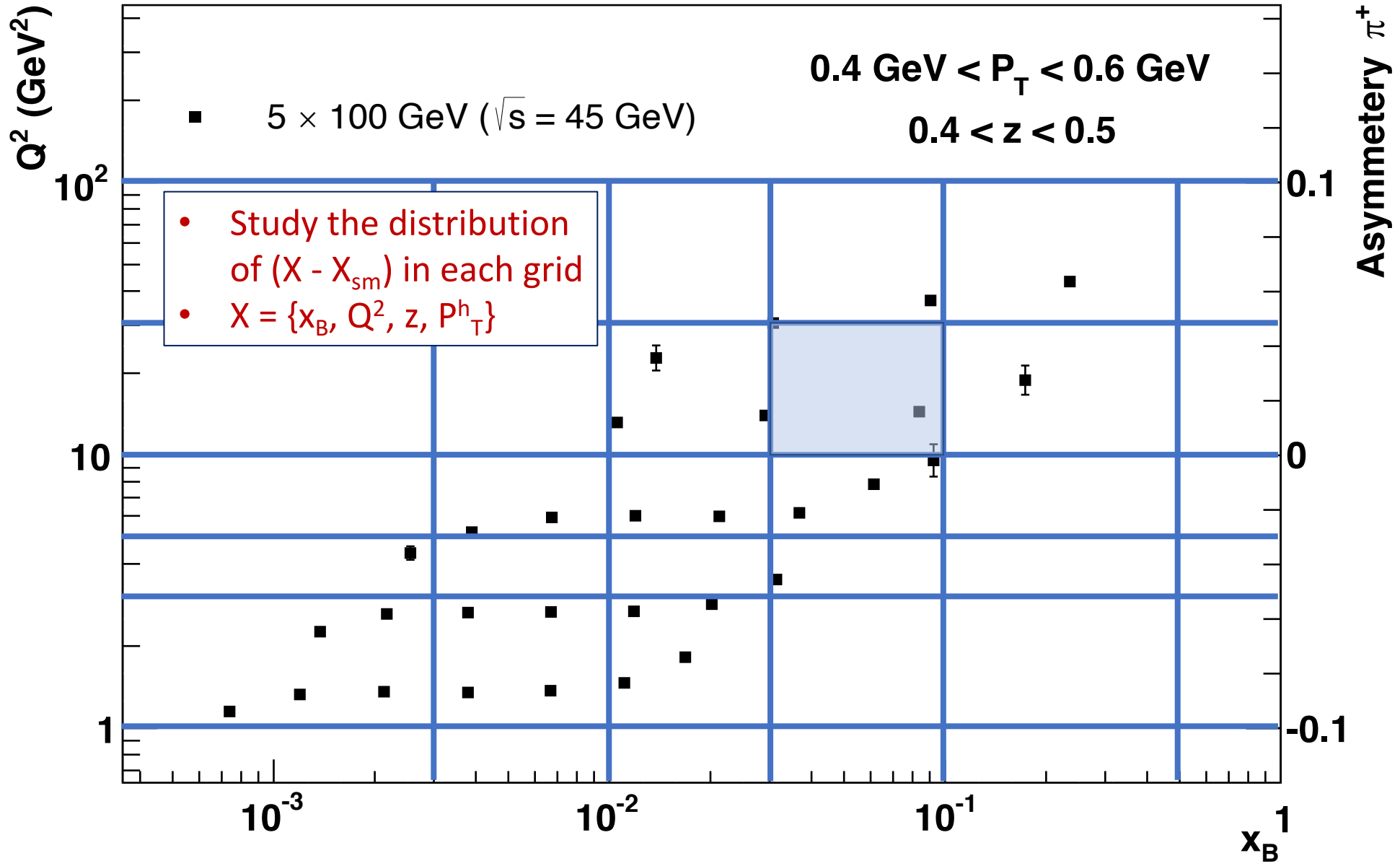


EIC SIDIS statistical projections on single spin asymmetry of π^+

$0.01 < y < 0.95$

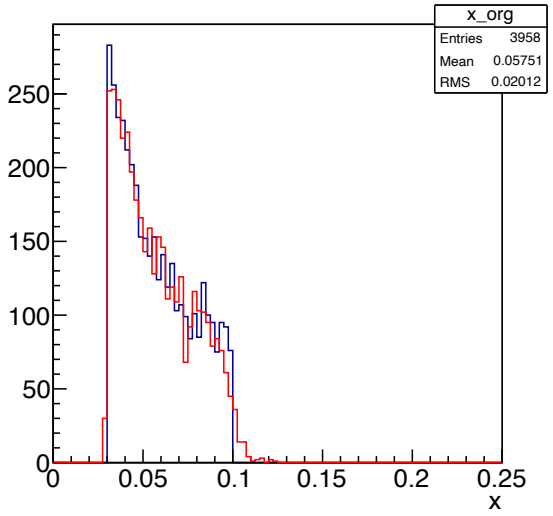


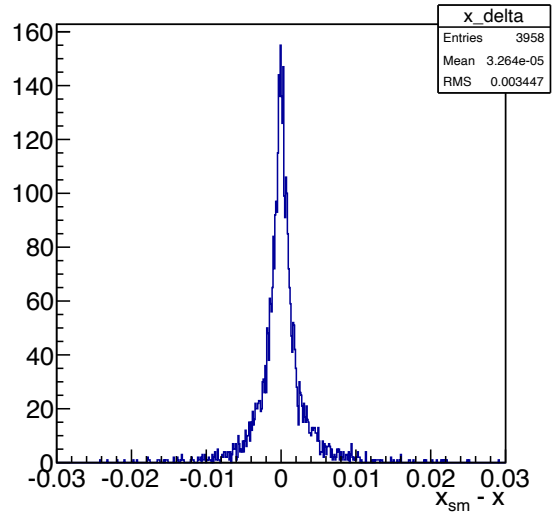
Resolution study for multidimensional bins of the projections

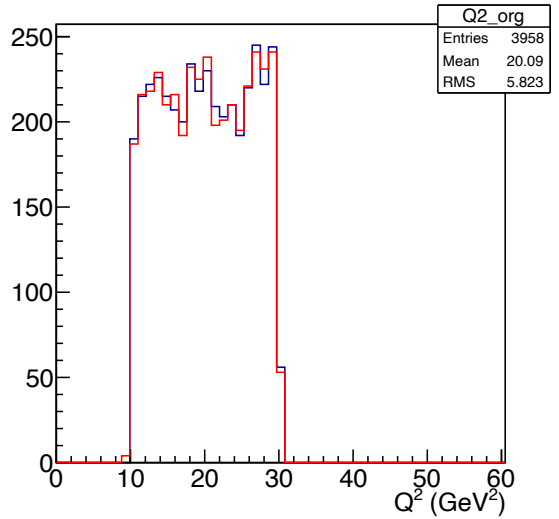


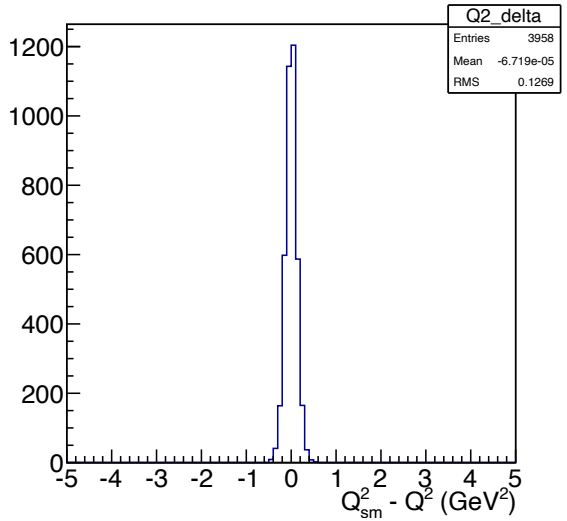
Comparison of smeared and non-smeared spectra of x, Q^2, z and P^h_T

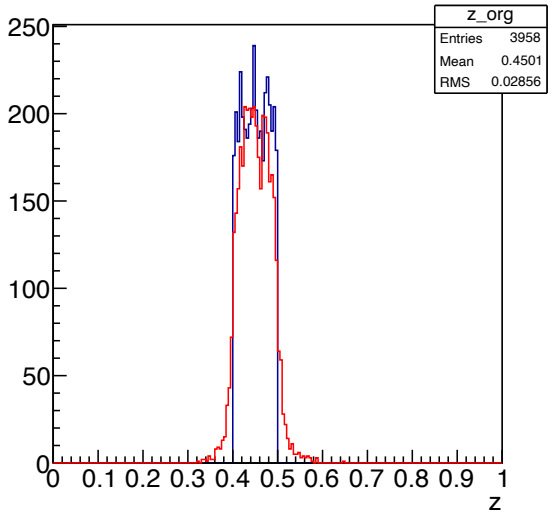
- Example from e-p 5 x 100, $0.03 < x < 0.1$, $10 < Q^2 < 30$ GeV^2, $0.4 < z < 0.5$, $0.4 < P^h_T < 0.6$ GeV

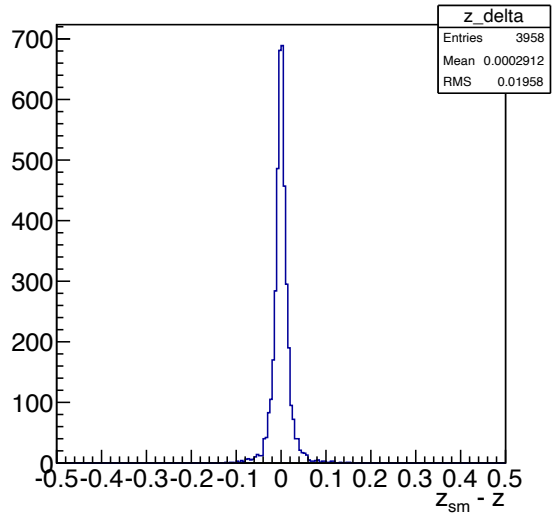


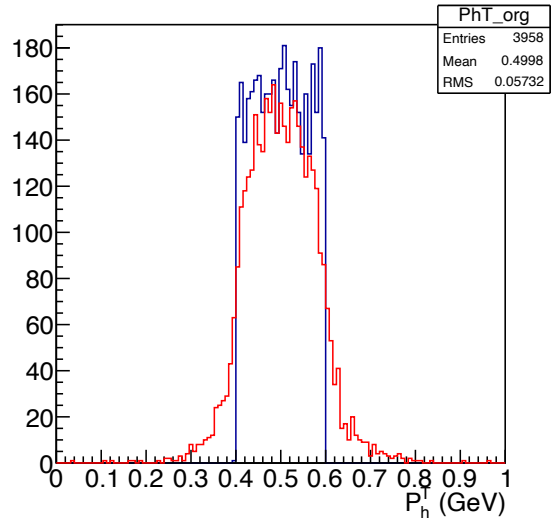


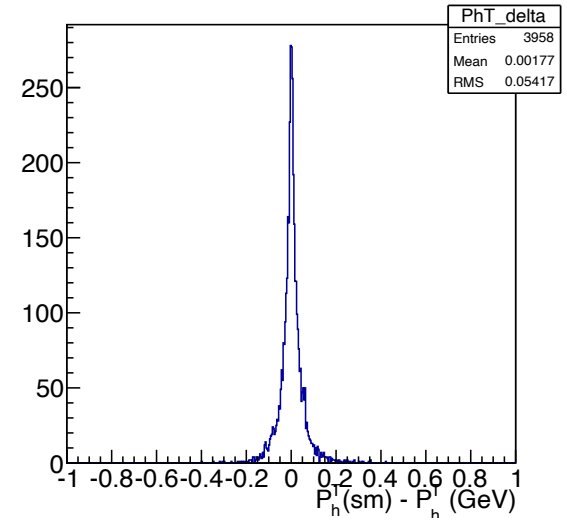




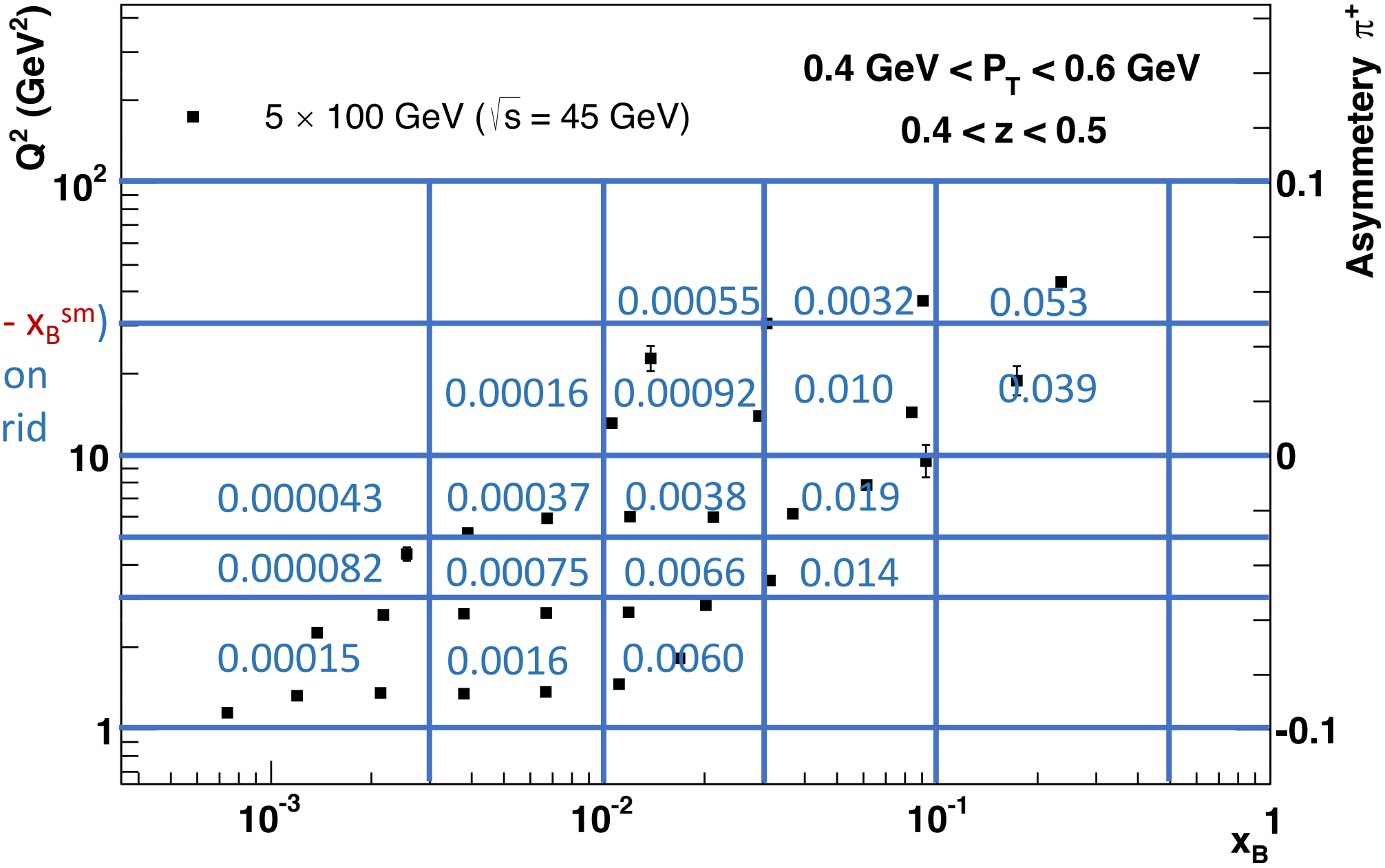








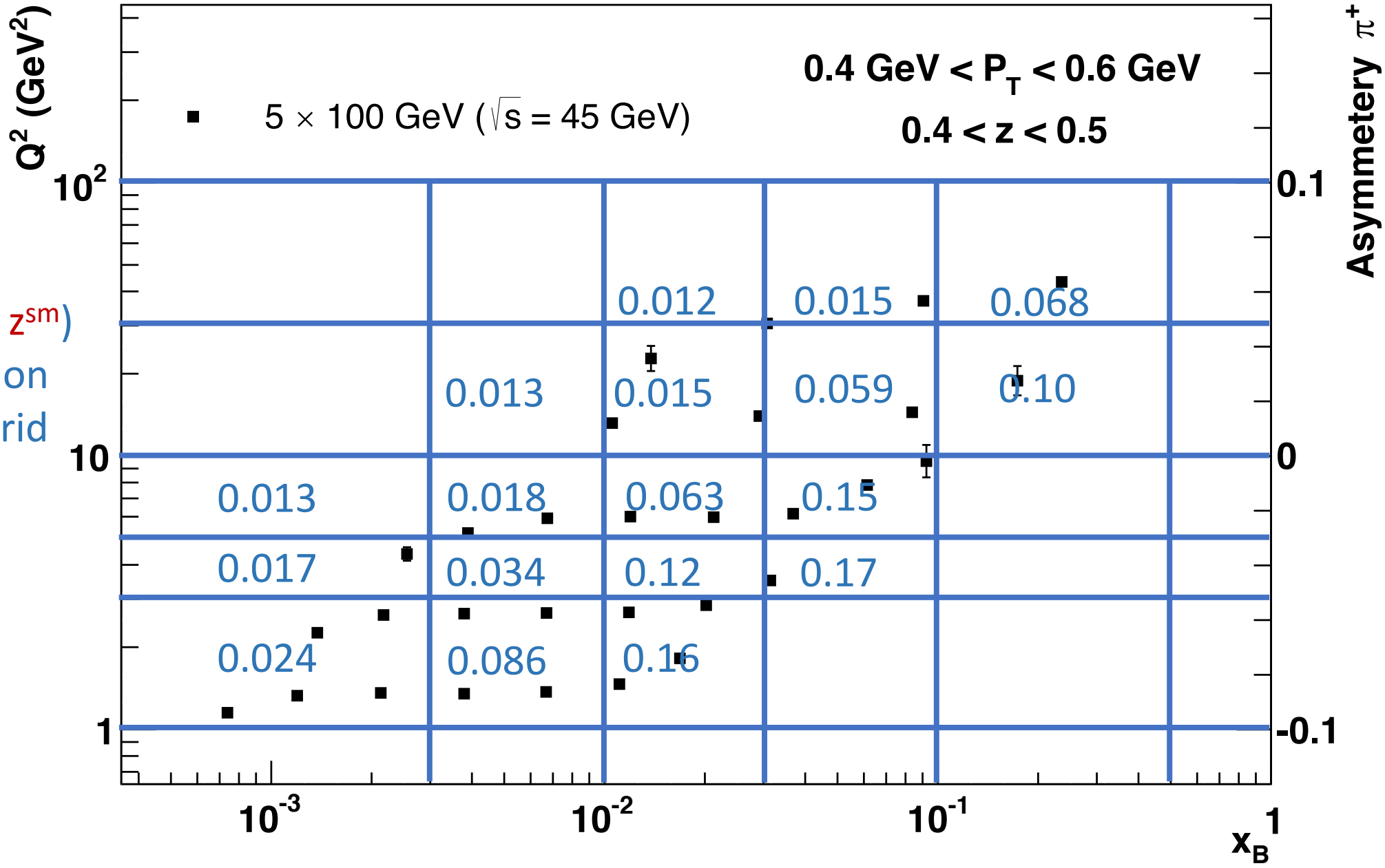
Resolution in x_B in each segmented area in $Q^2 - x_B$ plane ($0.05 < y < 0.95$)



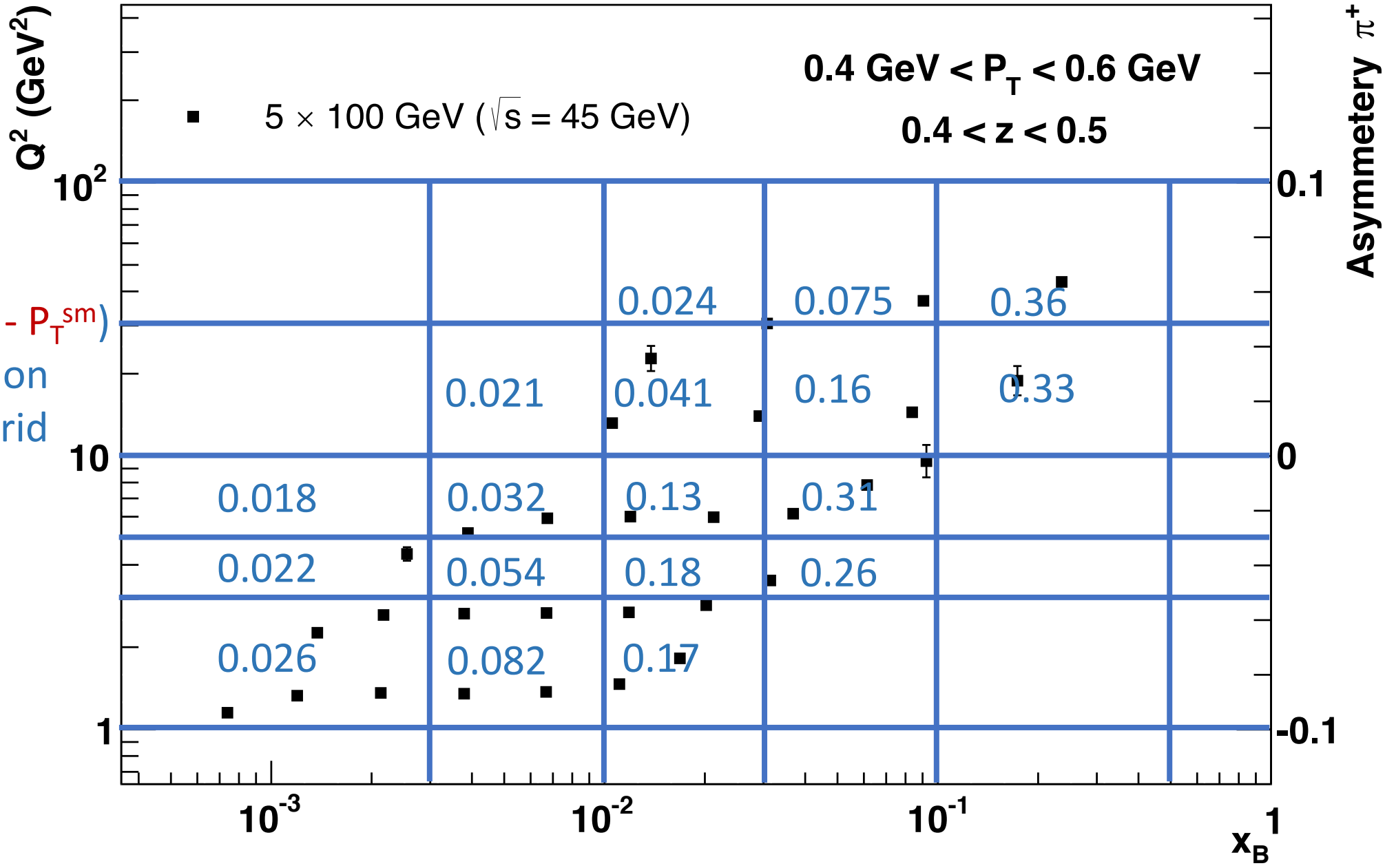
3σ of (x_B - x_B^{sm}) distribution in each grid

Resolution in z in each segmented area in $Q^2 - x_B$ plane ($0.05 < y < 0.95$)

3σ of $(z - z^{sm})$ distribution in each grid



Resolution in P^h_T in each segmented area in $Q^2 - x_B$ plane ($0.05 < y < 0.95$)



3σ of (P_T - P_T^{sm}) distribution in each grid