SIDIS Systematics

August 19

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Sources of systematics for most SIDIS measurements

- PID correction: eventually have PID efficiency/fake rate matrices and perform unfolding of reconstructed PID → Uncertainties from PID matrix uncertainties (random sampling) and potentially extraction method (how to extrapolate from Data-based PID matrices to MC based ones) – maybe ask for matrices from DIRC/dRHIC people as stop-gap measure
- Kinematics smearing unfolding: Correct for detector effects on reconstructed kinematics (4-6D and spin dependent). Requires large full MC sets, multi-D unfolding techniques (RooUnfold?,Multifold?)→Uncertainties from Unfolding method and # iterations [This includes electron finding and DIS kinematics smearing] – mostly coming from electron kinematics

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Systematics continued

- Radiative corrections: Correct from measured kinematics to kinematics corrected for ISR/FSR, requires good RadCor codes, currently only DJANGOH, to a lesser extend available in Pythia, etc.→understand uncertainties from different generators, potentially reweighting them to match data yields.
- For cross section/unpolarized measurements: Efficiency corrections and uncertainties on them (run dependence, MC tuning?)
- For eD/eHe3 related neutron measurements need to estimate spectator proton efficiencies→ uncertainties on these efficiencies
- Main Question: How to estimate many of these systematics now?

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