Baffles and new B field map

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SoLID Simulation Meeting
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Intro

- To date the SoLID B field has been modeled with a 2-dimensional model assuming continuous azimuthal symmetry
- Jay Benesch has modeled the SoLID B field in 3 dimensions
- Zhiwen has created a field map file from Jay's results
- Development version of solid_gemc, based on GEMC 2.7, has new code to read and interpolate this field map… now debugged and appears working
- What effect on PVDIS physics?

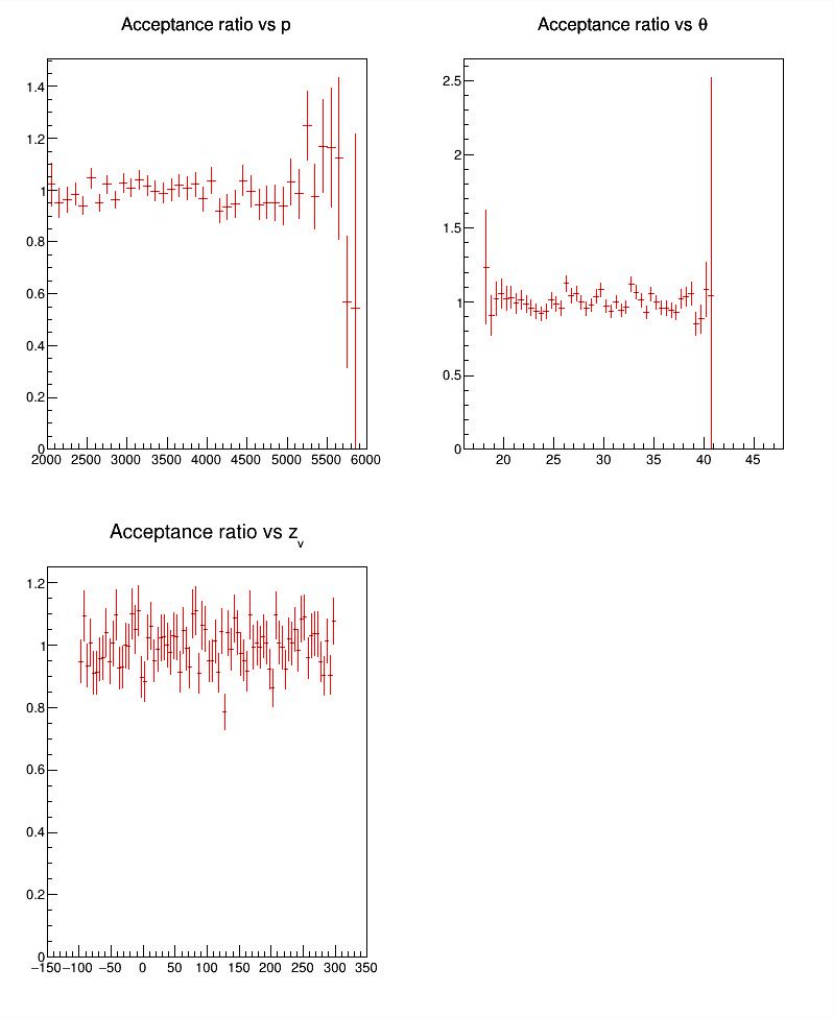
Geometric acceptance for electrons

Throw 1e6 electrons in p = 2–6 GeV/c, θ = 15° – 45°, ϕ = -180° – 180°, z_v = -100 — 300 mm

Apparatus is Kryptonite baffles and solenoid, virtual planes around baffles

Acceptance = (# electrons reaching downstream end of baffles) / (# electrons reaching same z without baffles)

Plot is ratio of acceptances for new, old field.



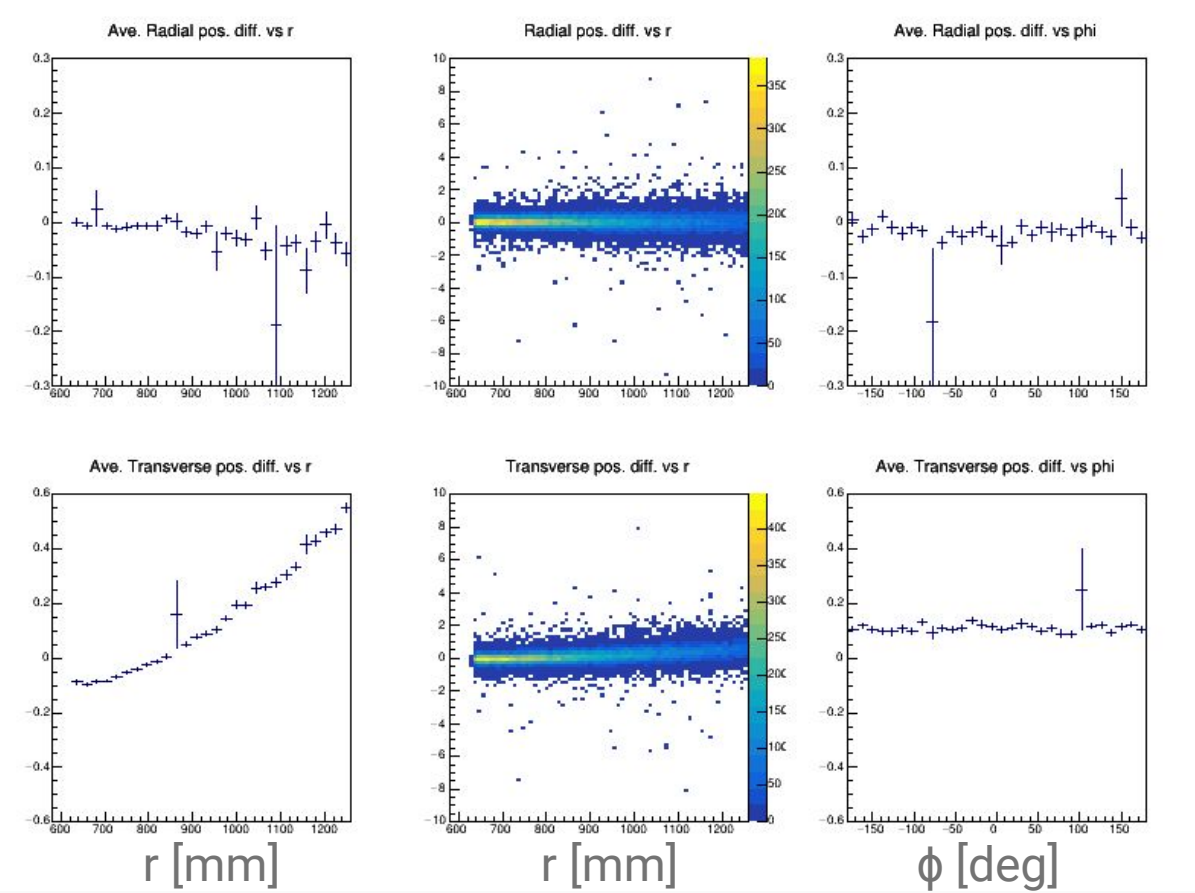
DIS electron positions

- 1e6 electrons from DIS generator; same primaries for new and old field simulations
- Kryptonite baffles and solenoid
- Most events have same # hits in same virtual planes
- For these, calculate difference of position vectors (Δ)
- Plot magnitude ($|\Delta|$), radial component (Δ_r), transverse component (Δ_t) vs r, ϕ coordinates

Small position shifts at large r

Δ_r [mm]

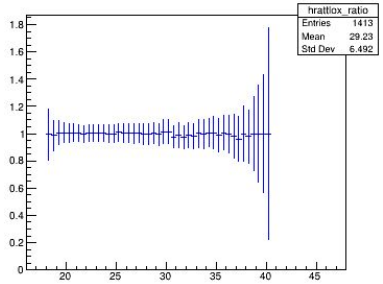
Δ_t [mm]

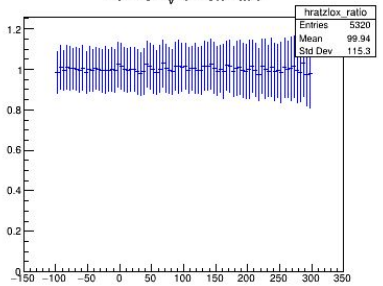


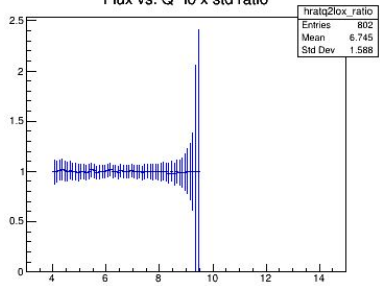
No azimuthal dependence

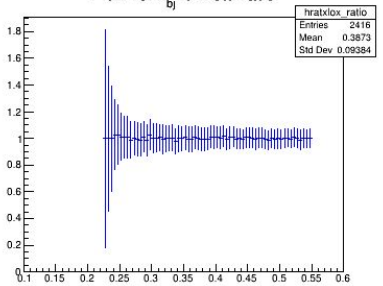
DIS flux comparison

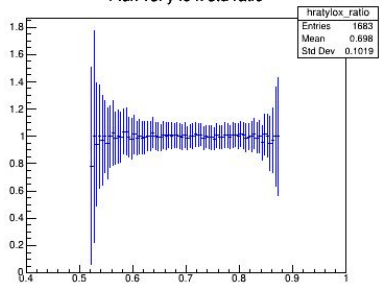
- 1e6 electrons from DIS generator; same primaries for new and old field simulations
- Kryptonite baffles and solenoid
- Plot flux at downstream end of baffles vs. kinematic variables and compare new, old fields



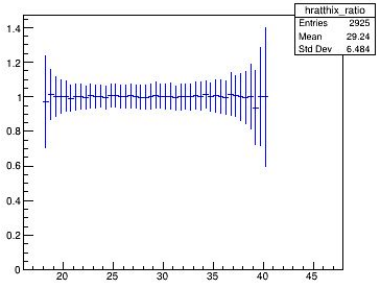


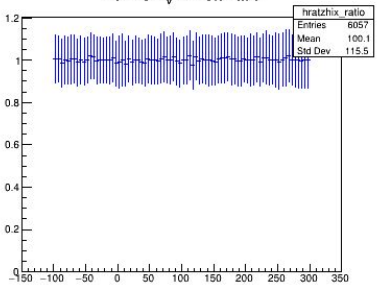


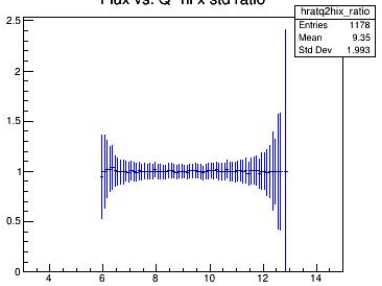


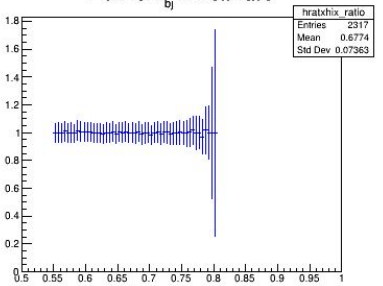


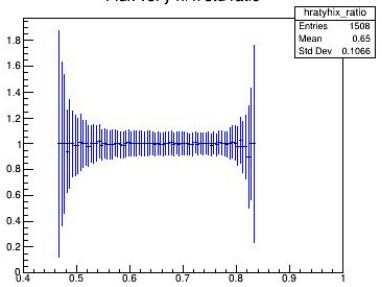
$x_{bj} < 0.55$





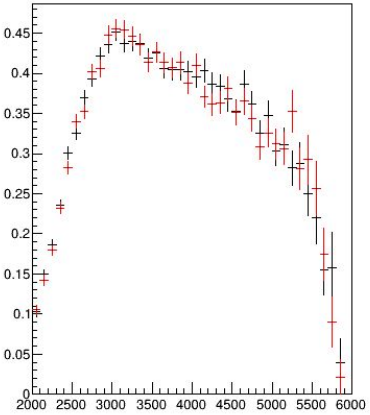


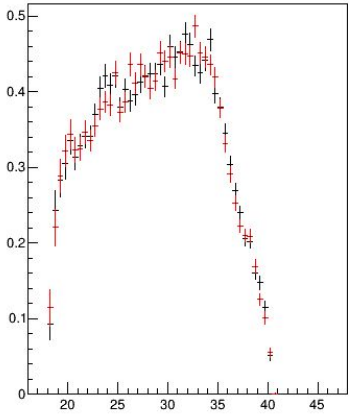


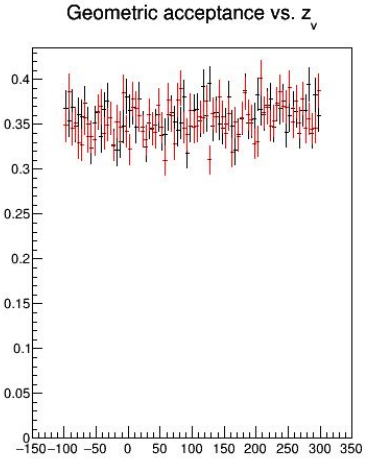


$x_{bj} > 0.55$

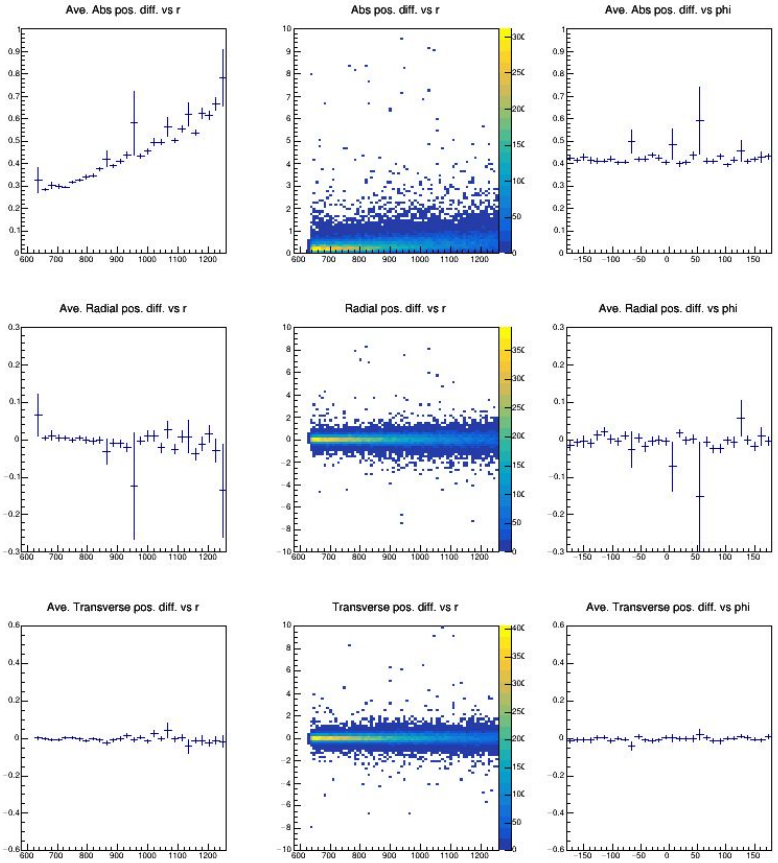
Extra


Geometric acceptance vs. p
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
2000 2500 3000 3500 4000 4500 5000 5500 6000


Geometric acceptance vs. θ
0.5
0.4
0.3
0.2
0.1
0
20 25 30 35 40 45


Geometric acceptance vs. z
v
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
−150 −100 −50 0 50 100 150 200 250 300 350

Old, new GEMC



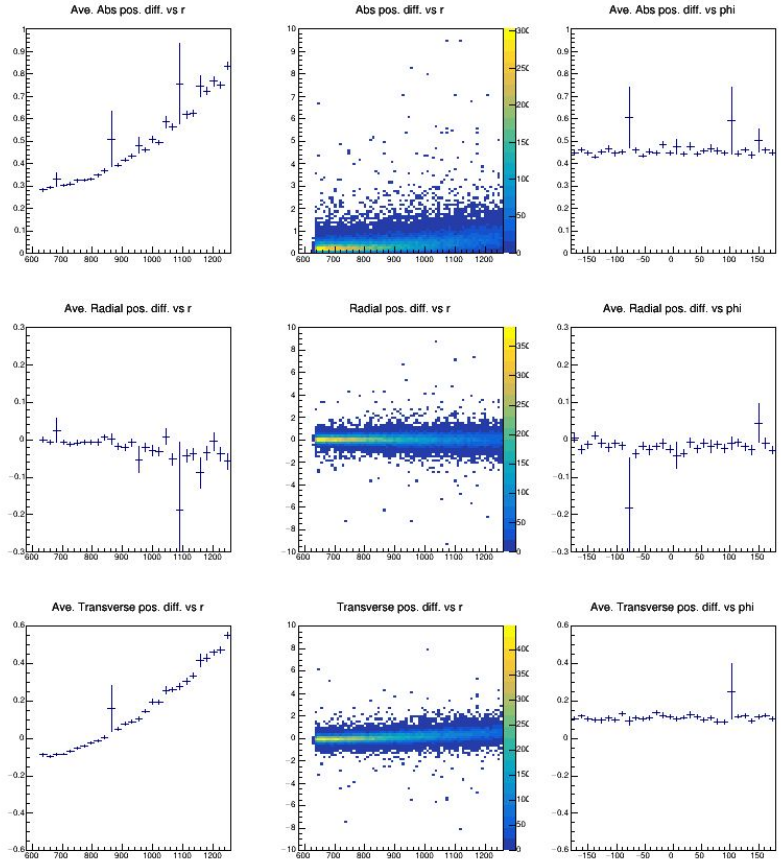
|Δ|

Δ_r

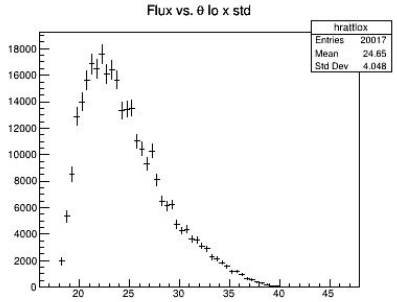
Δ_t

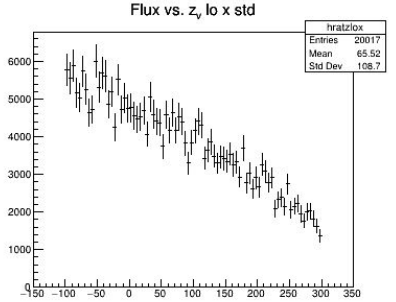
Ave. vs r | Value vs r | Ave. vs Δ

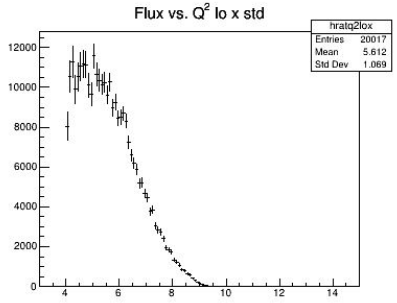
Old, new field

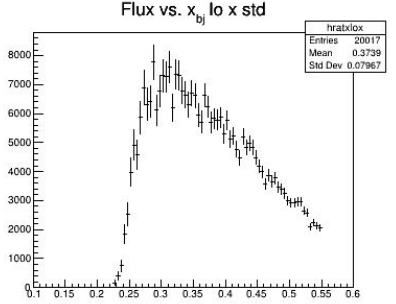


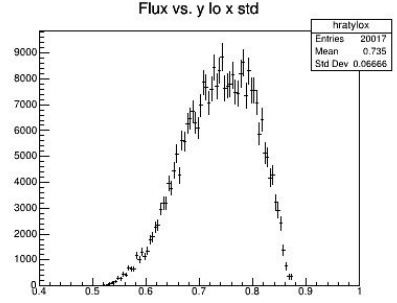
Ave. vs r | Value vs r | Ave. vs Δ











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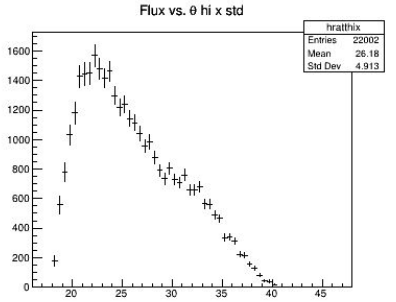

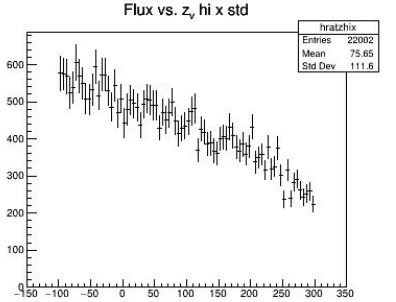

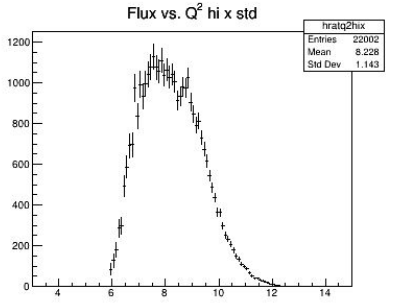

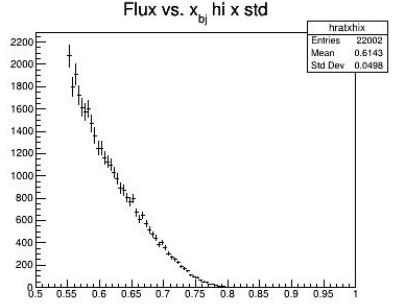

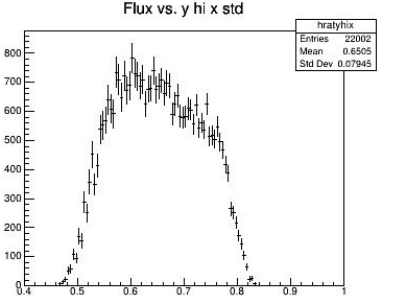

$x_{bj} > 0.55$