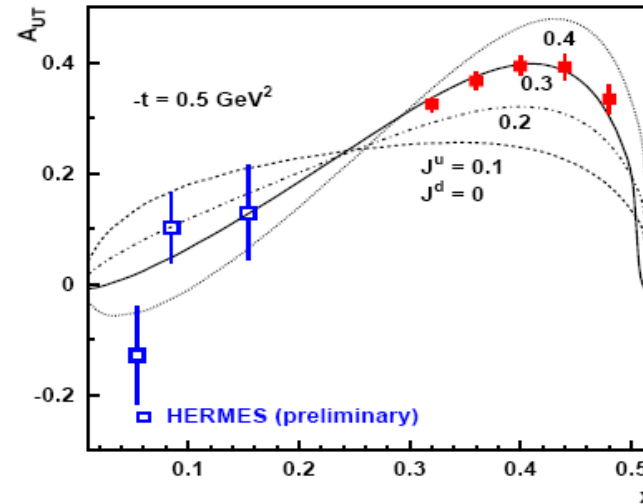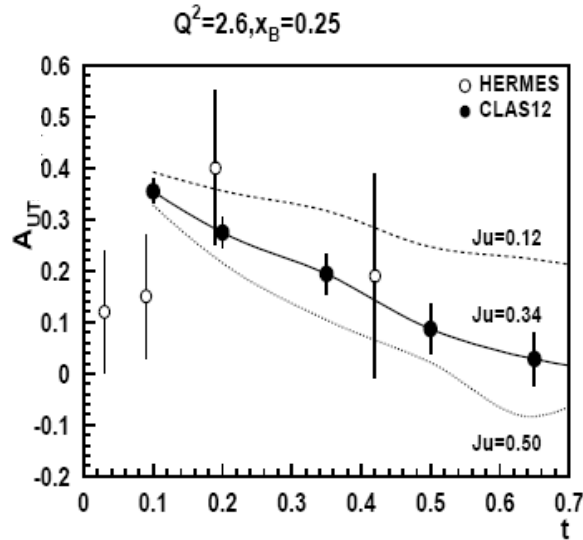# CLAS Transversely polarized target

H.Avakian, P.Bosted and K.Griffioen

Hall B 12 GeV upgrade workshop Feb 2-3

- **Physics and kinematical coverage**
- **GEANT simulation**
- **Summary**

GPD Physics

Figure 8: Projected transverse spin asymmetry ($A_{UT}^{\sin\phi}$) in exclusive photon production at 11 GeV. All points correspond to different values of J_u calculated for the bin with with $< Q^2 >= 2.6$ and $< x >= 0.25$ (left). Projections for transverse target asymmetry for exclusive ρ^0 production from hydrogen target (filled squares) using CLAS12 compared to preliminary HERMES data [15].

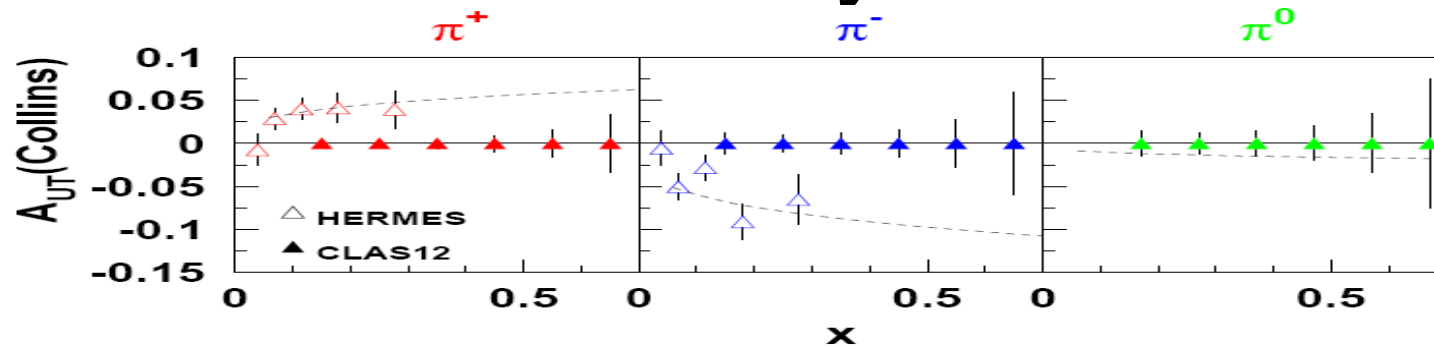**Direct access to Orbital Momentum of Quarks!**

TMD Physics

Figure 1: Projected transverse spin asymmetry from the Collins effect ($A_{UT}^{\sin(\phi+\phi_S)}$) in single π production with CLAS at 11 GeV.
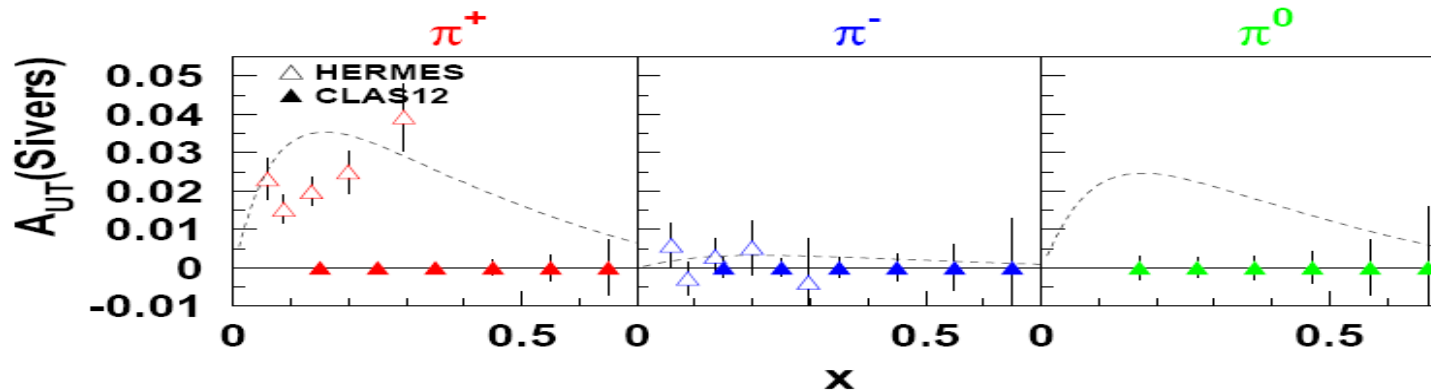

Figure 2: Projected transverse spin asymmetry from the Sivers effect ($A_{UT}^{\sin(\phi-\phi_S)}$) in single π production with CLAS at 11 GeV.

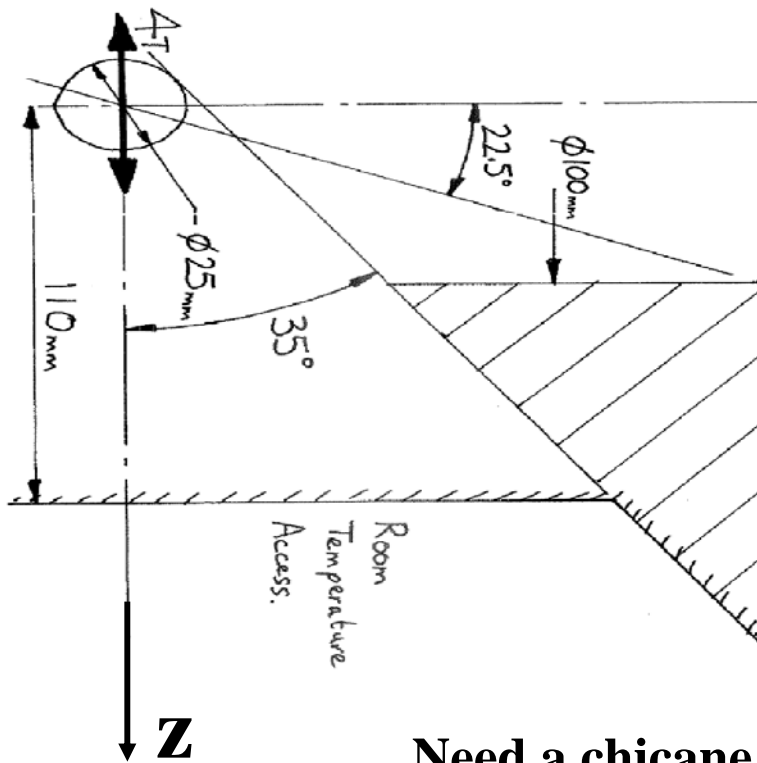**Direct access to transverse momentum of quarks and Spin-Orbit Correlations**

3

CLAS Transversely Polarized Target
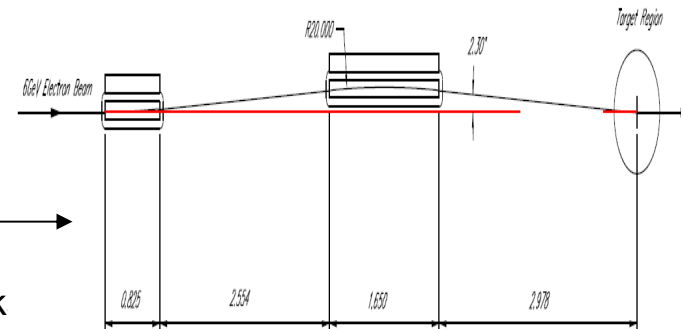## UVA/OXFORD

Acceptance:
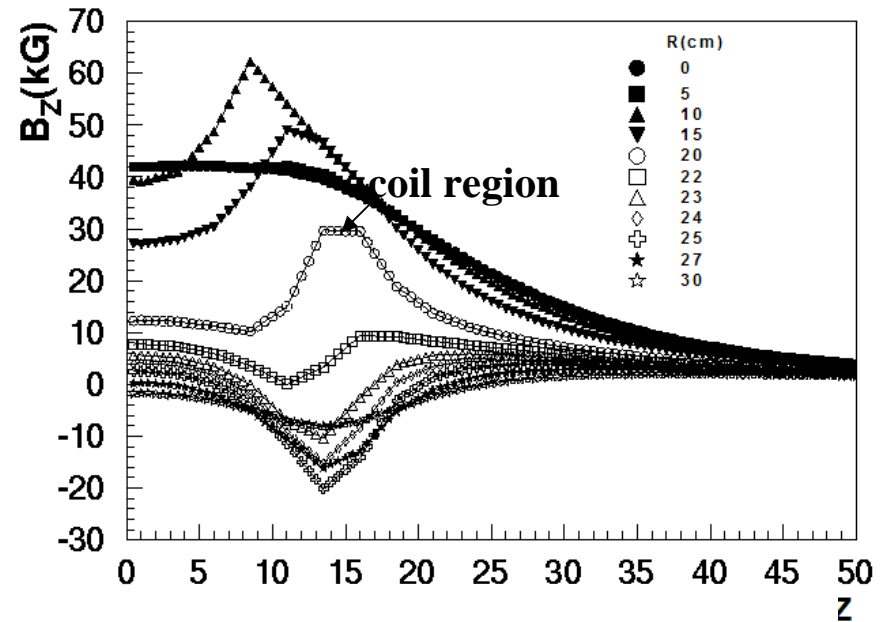 θ<22.5 degree (forward cone)
55<θ<125 (transverse)

Maximum field 4.2T

coil region

Need a chicane system

CLAS Transversely Polarized Target

θ<22.5 degree impact

22.5°
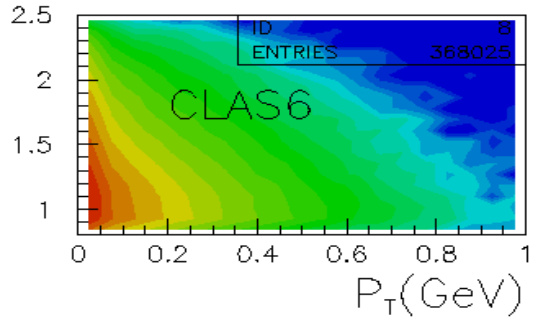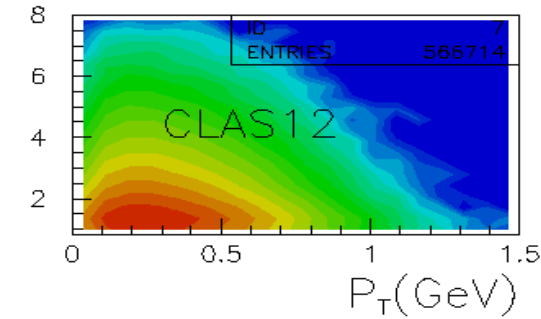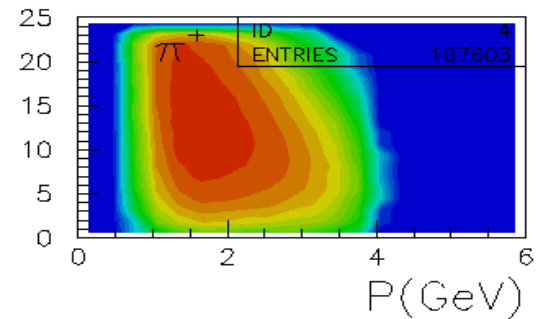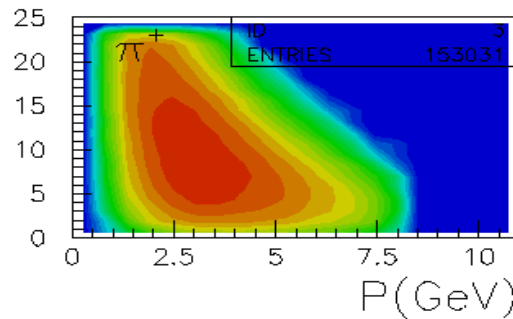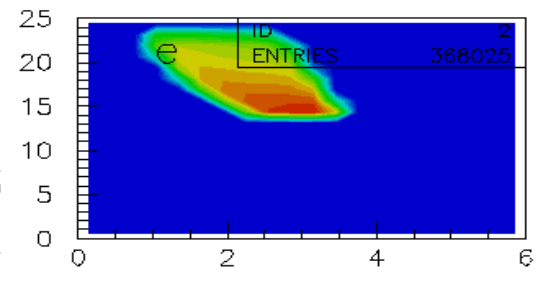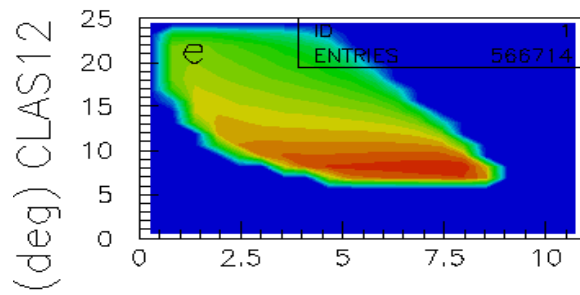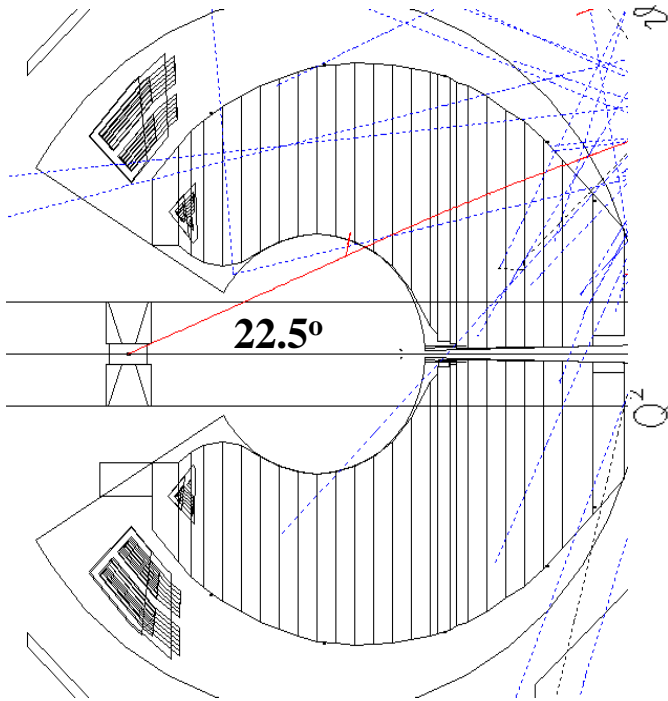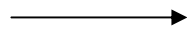
Moller electrons: GEANT simulation
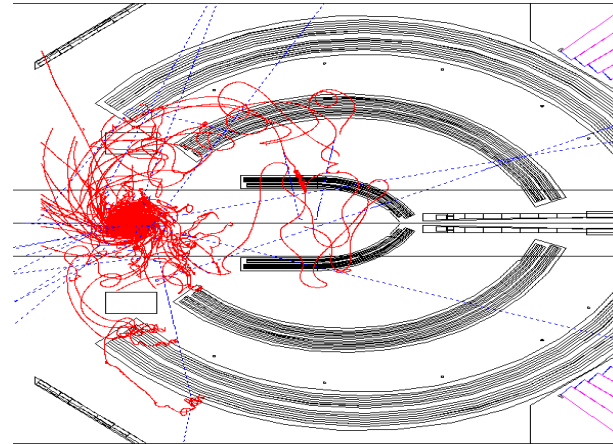
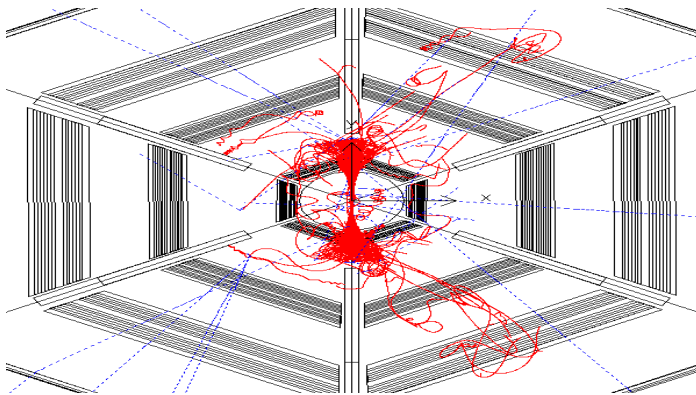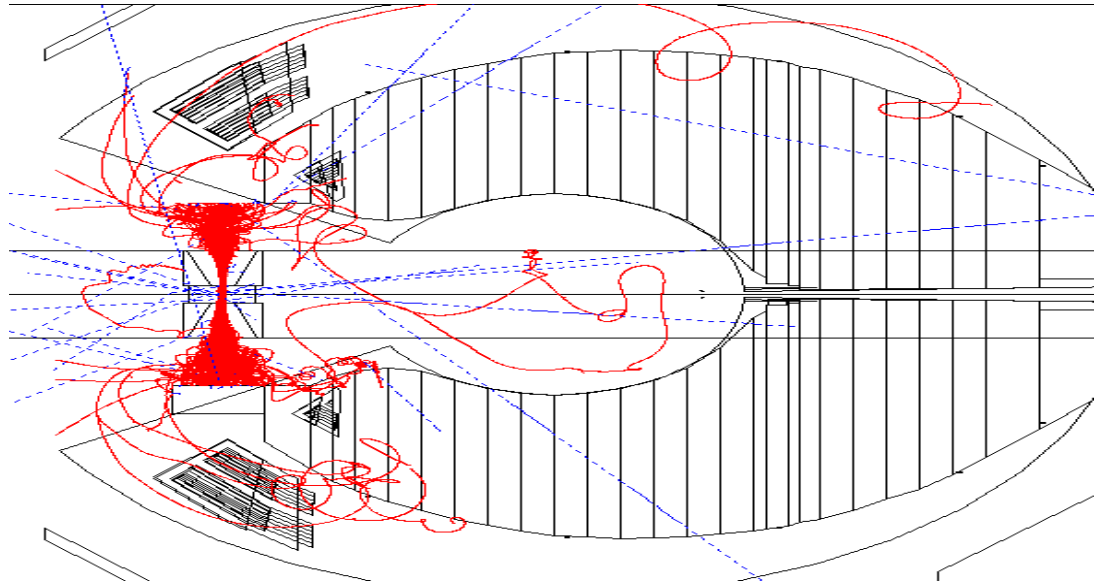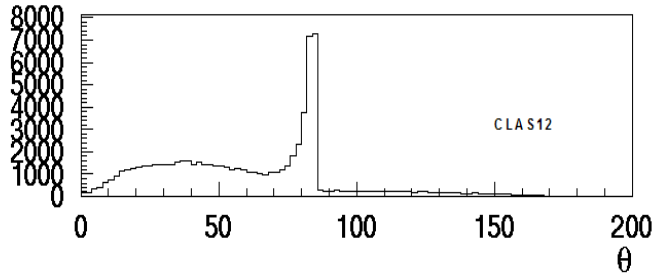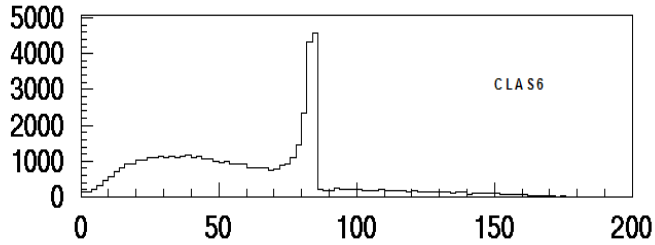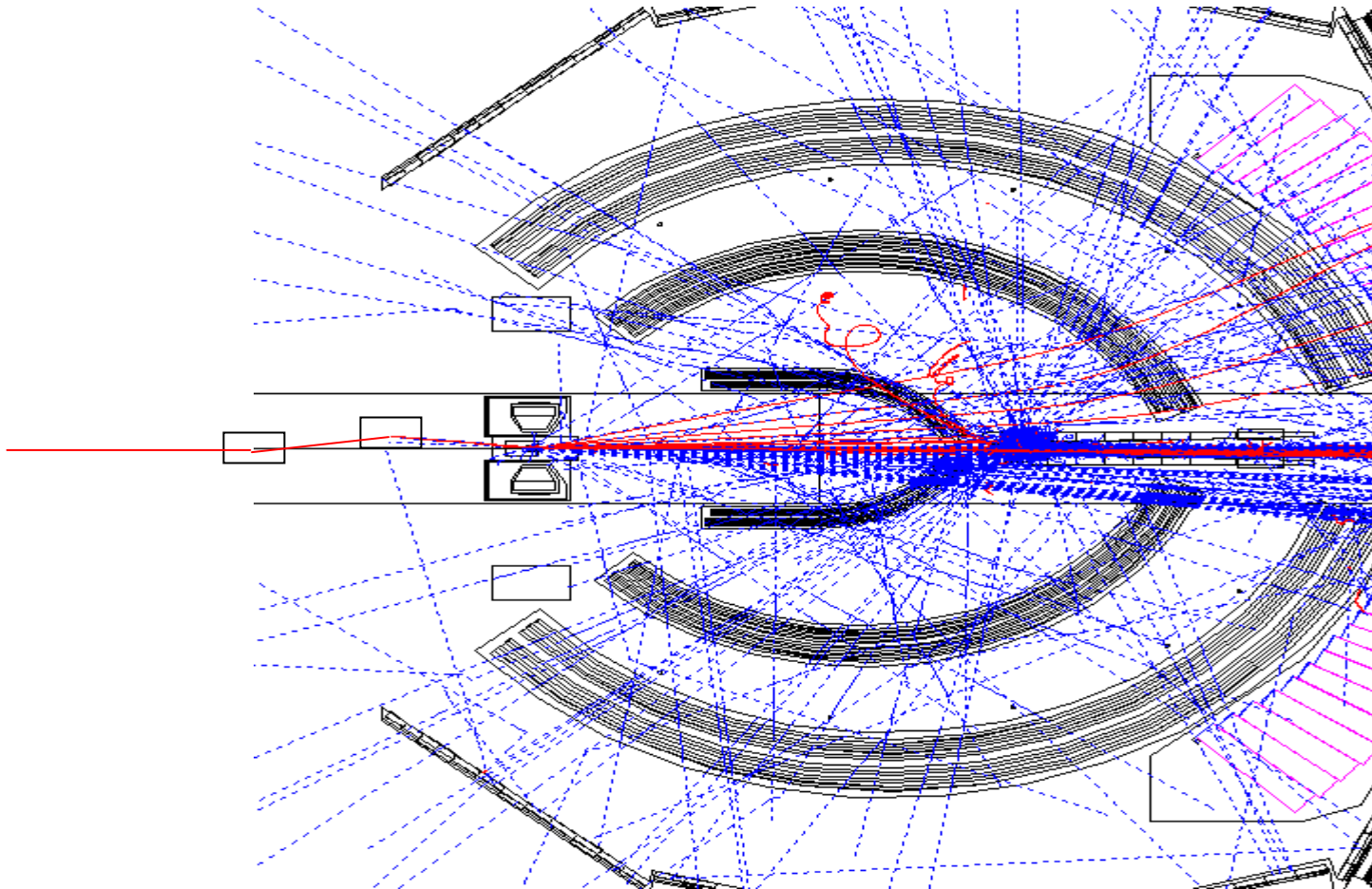**Low energy electrons follow the magnetic field (in y-axis)**

Transverse target:

"sheet of flame"

Beam deflection angle ~5 degree (BdL~1.7Tm)

Summary

• Physics with Transversely polarized target crucial for upgrade

• Transverse target design in progress at OXFORD (field maps available)

• Transverse target field (clas/parms/bgrid.TransTarg.fpk) available for GSIM studies

• GSIM studies of scattering of high lumi beam with transverse target in progress.

Optimize/define:
   Transverse target torus interaction
   chicane magnet parameters (positions, fields)
   shielding, and background effects on reconstruction

Prepare proposal for CLAS6+CLAS12 transverse target

CLAS Setup