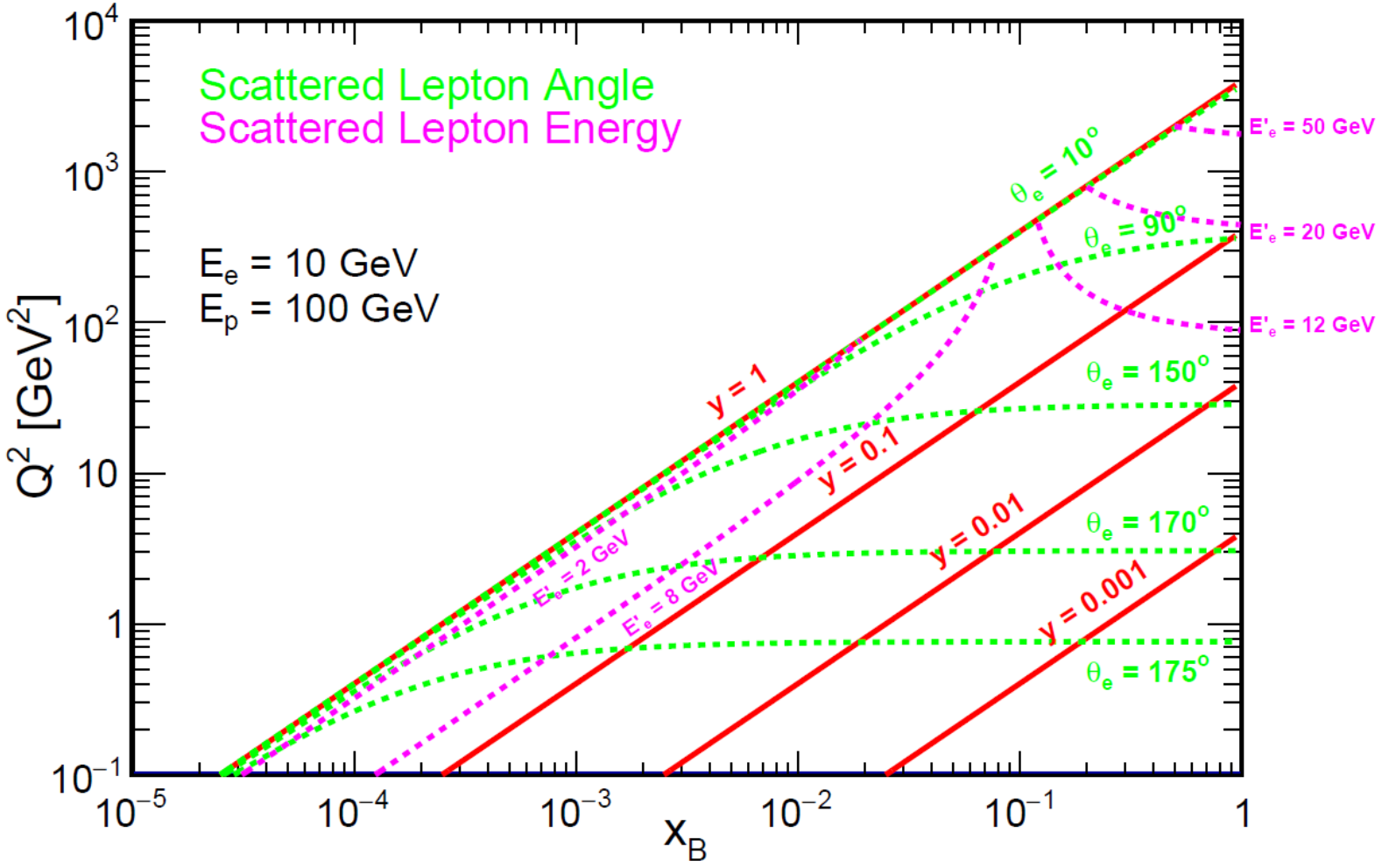
Neutral Current Inclusive Hit Maps

Barak Schmookler

Outline

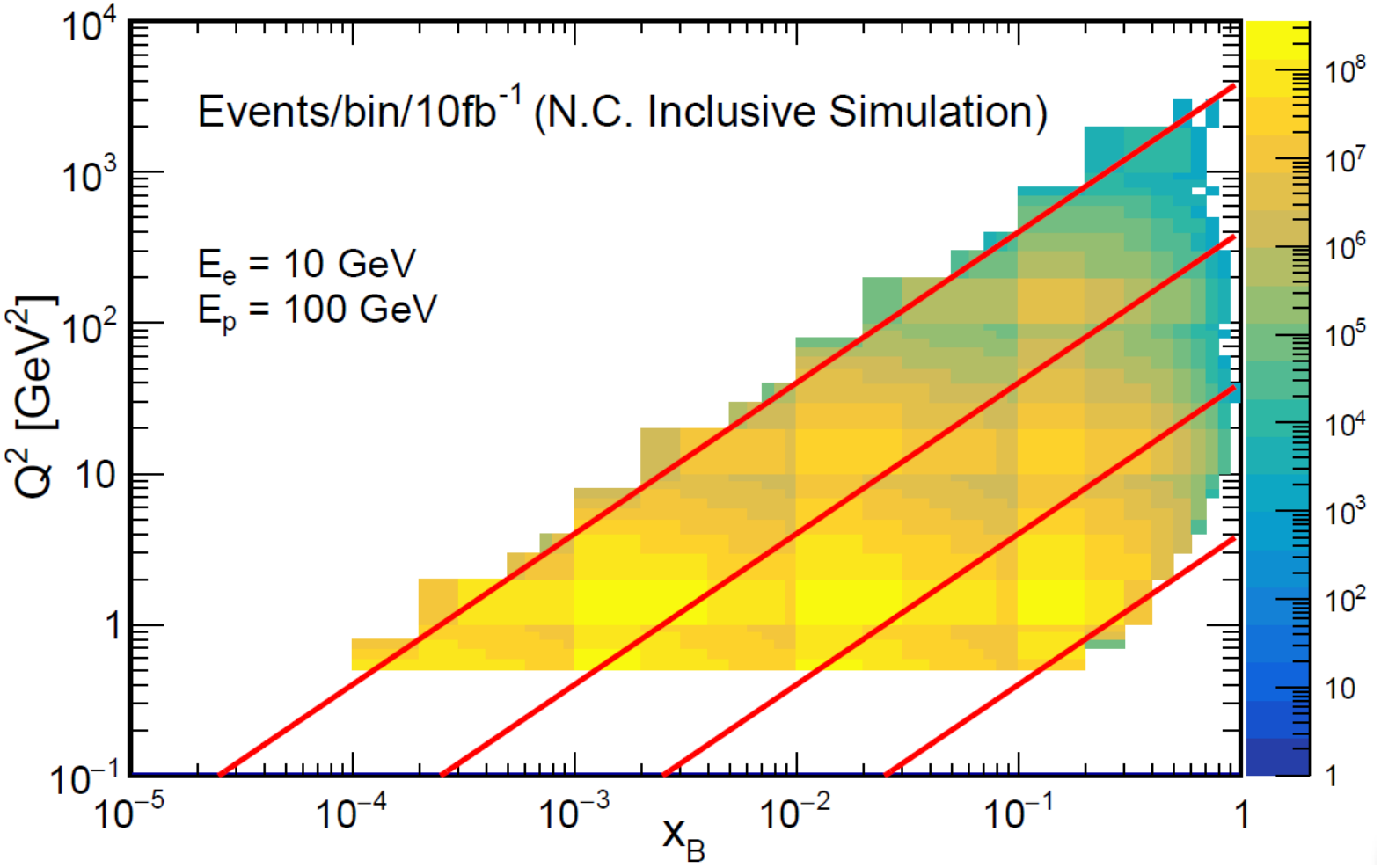
- One important item our group needs to provide to the detector group is the distribution of momentum and scattering angle for the final-state particles.
- We've created these hit maps using the *PYTHIA6* generator for electron-proton scattering for the 4 required beam energy combinations. (Thanks to Xiaoxuan for providing the plotting template.)
- We are now working to recreate these maps assuming a non-zero beam crossing angle (i.e. 25 mRad and 50 mRad). This will be completed this week.
- We also will use the *BeAGLE* event generator to create similar hit maps for eA scattering

Kinematic Phase Space for 10 GeV x 100 GeV

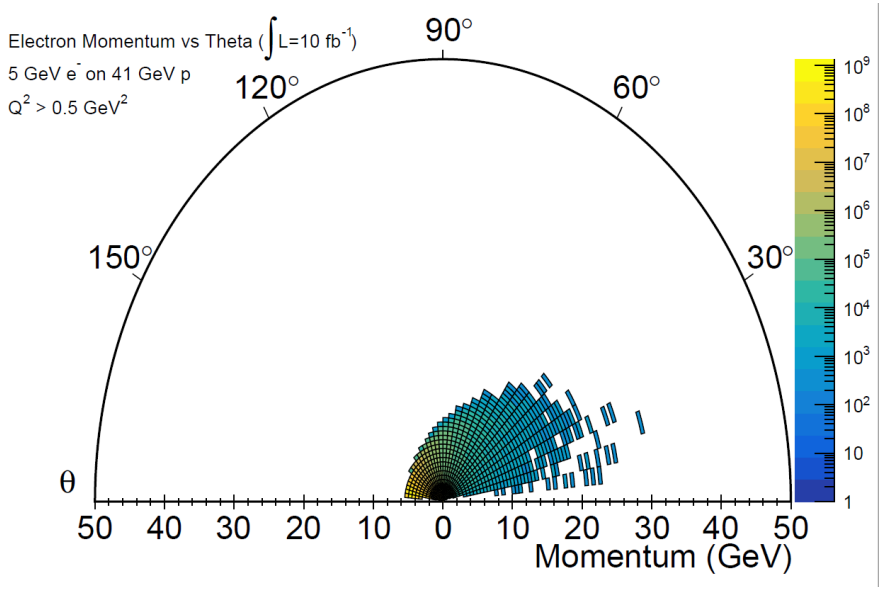


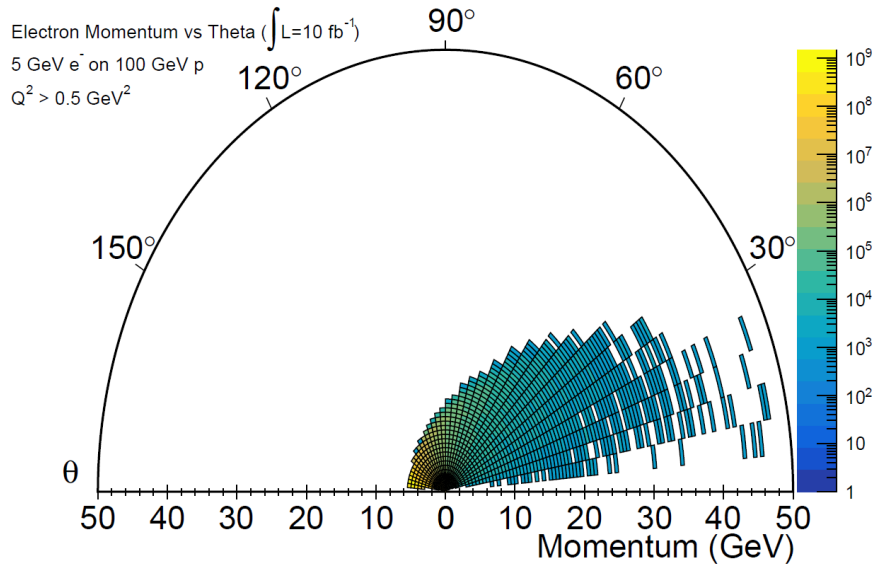
Kinematic Phase Space for 10 GeV x 100 GeV

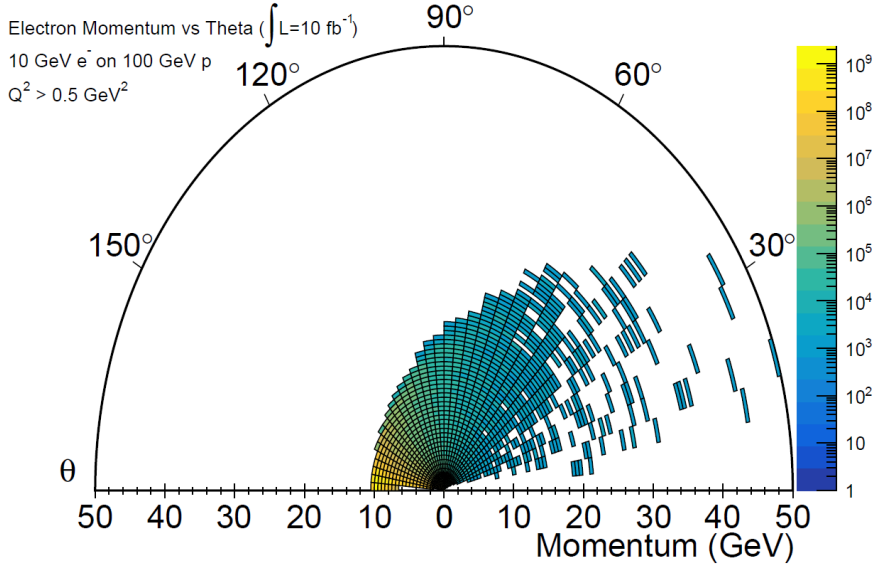
Yields calculated from *Pythia6*

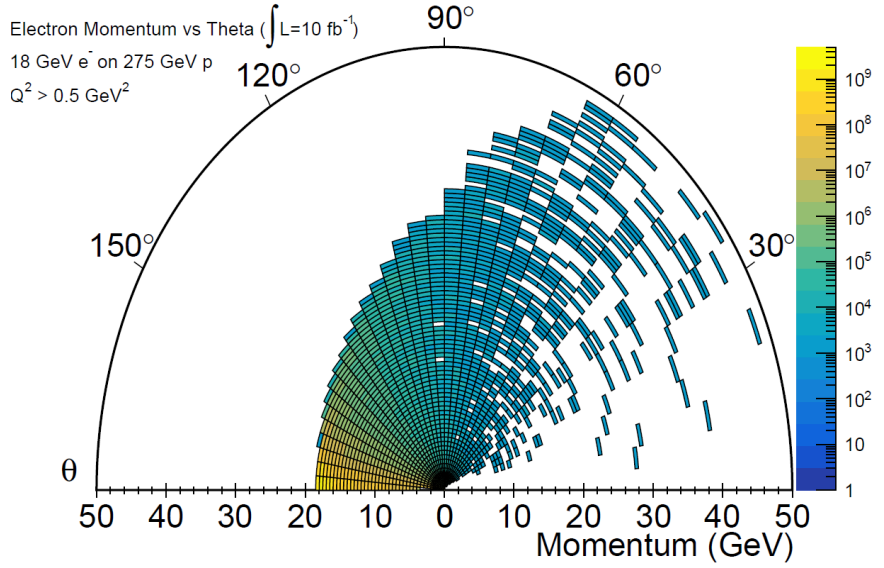


Scattered Electron Hit Maps

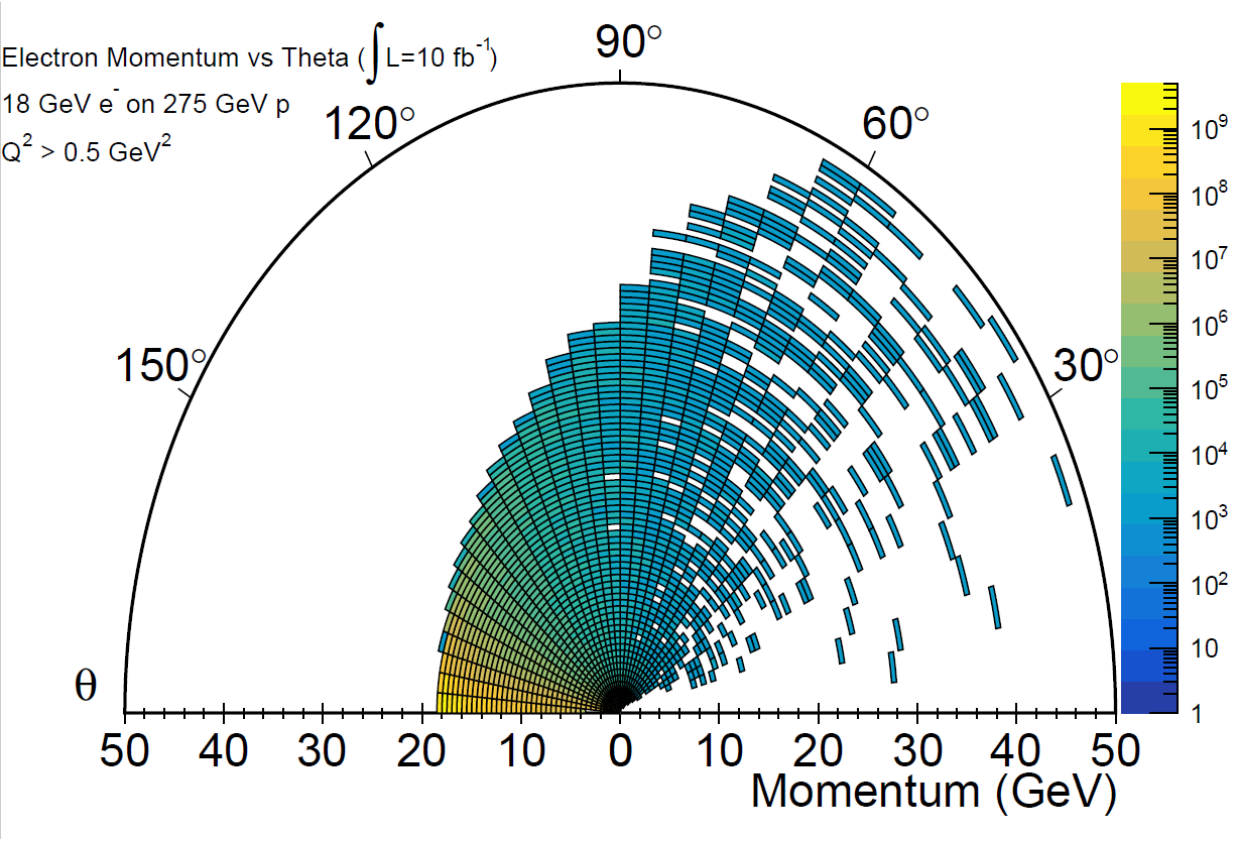


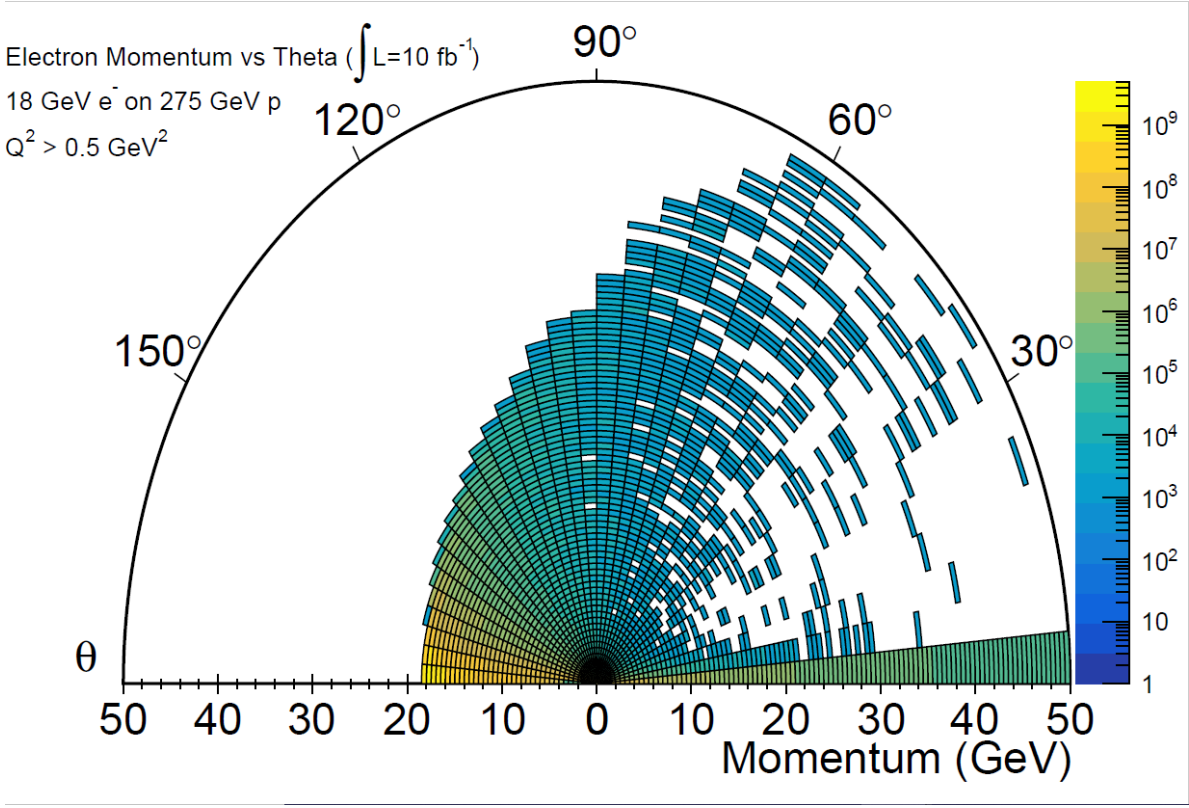




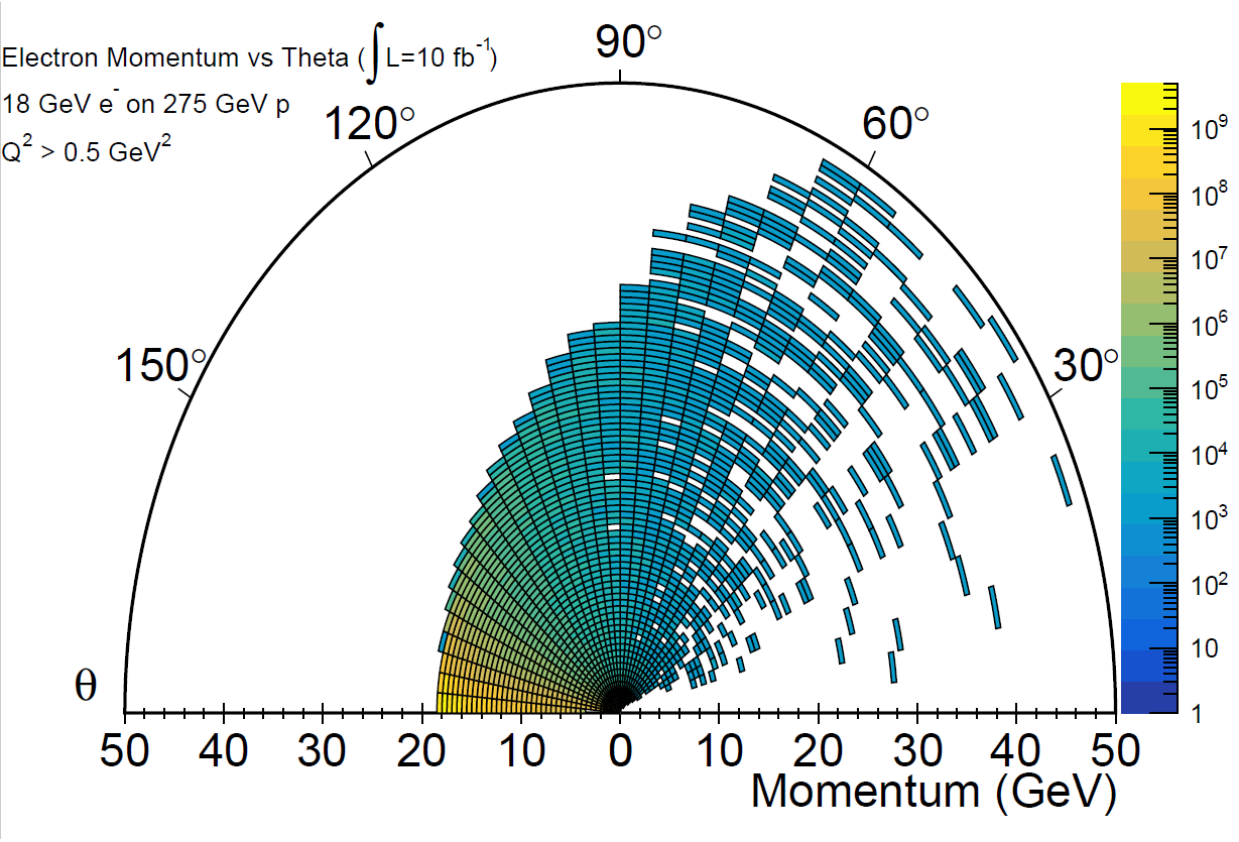


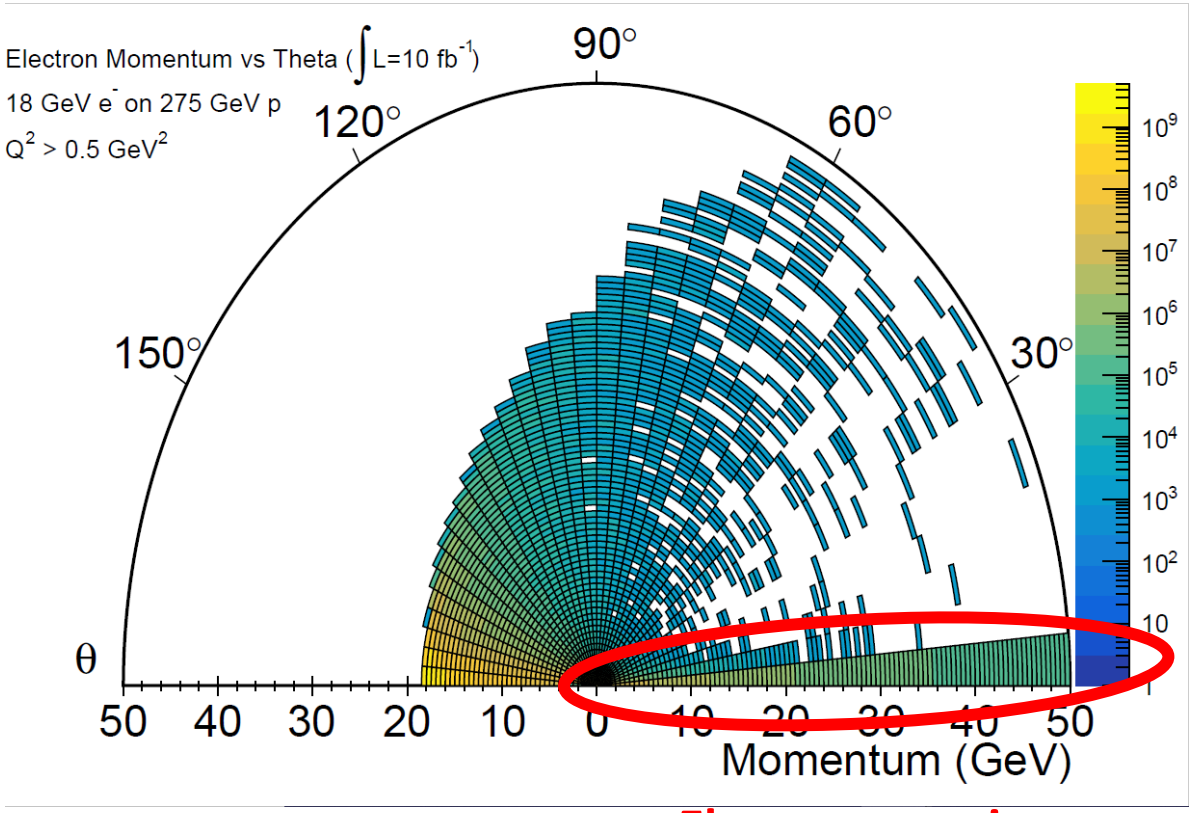
Scattered Electron vs. All Final-State Electrons





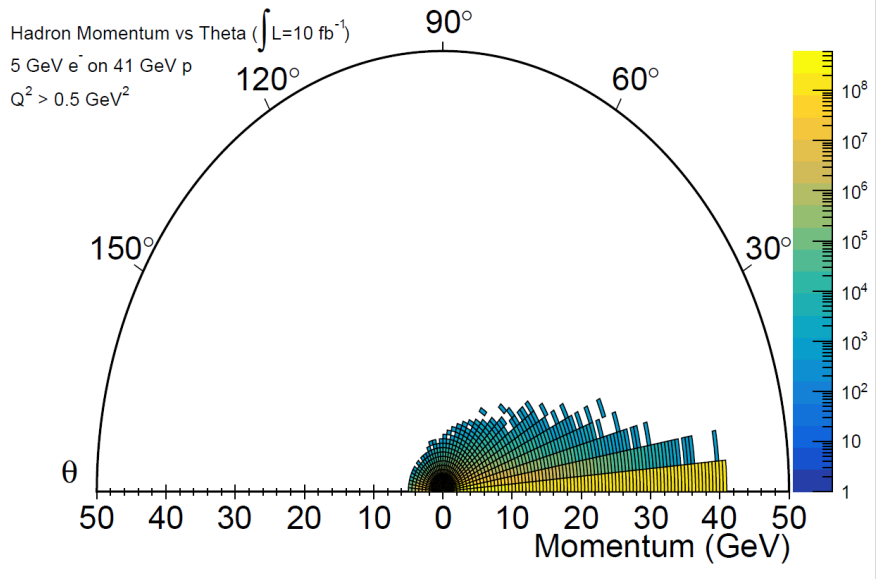
Scattered Electron vs. All Final-State Electrons

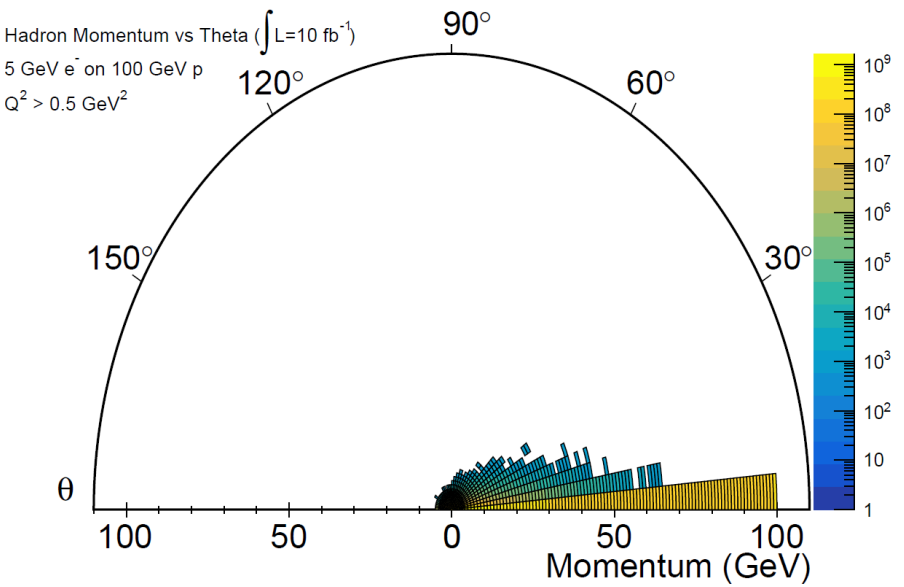


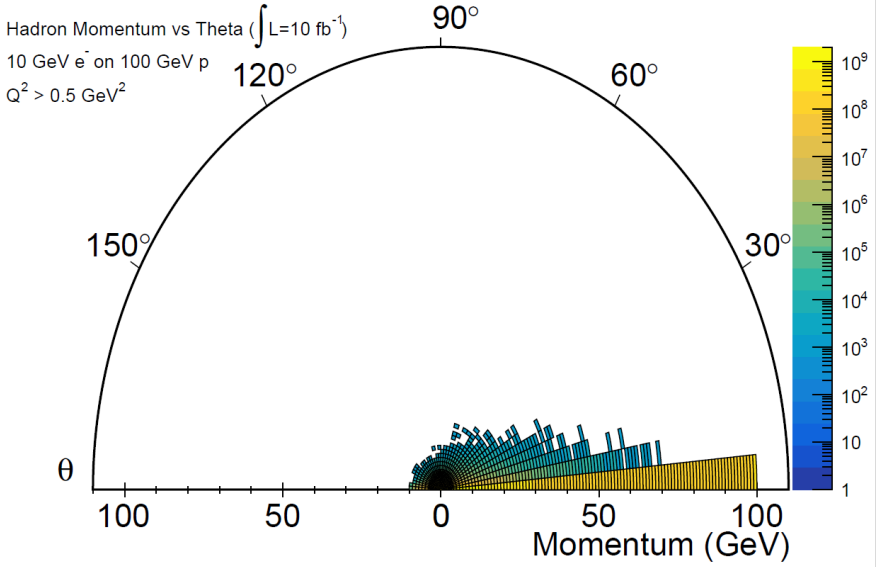


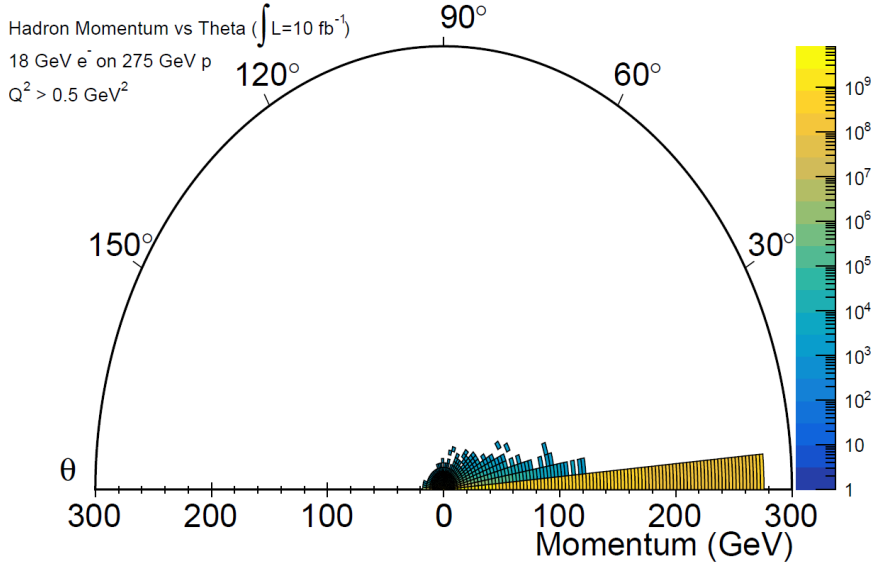
Electrons coming from decays, etc…

Final-State Hadrons Hit Maps

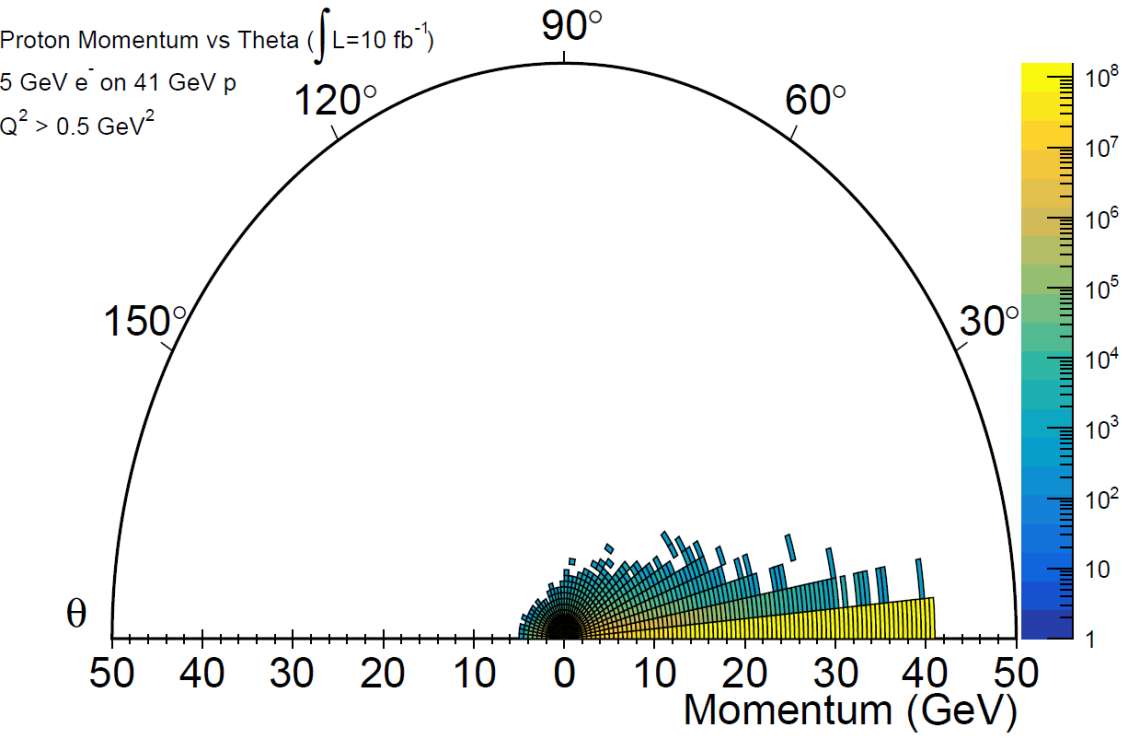


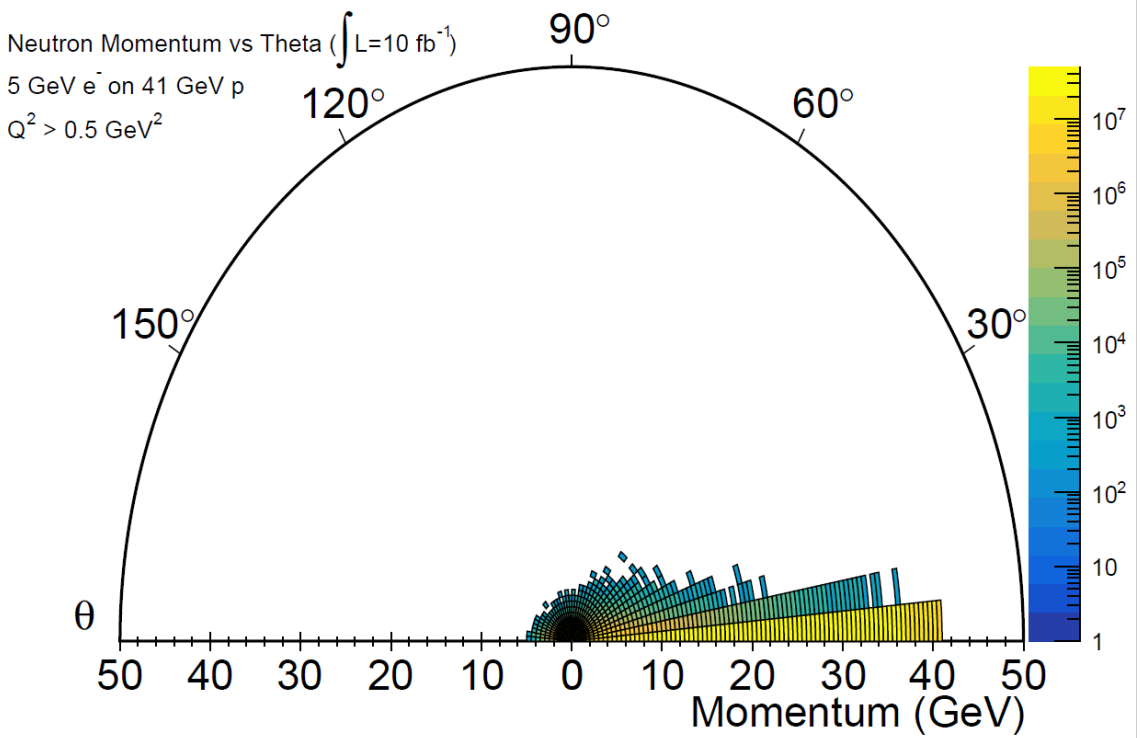




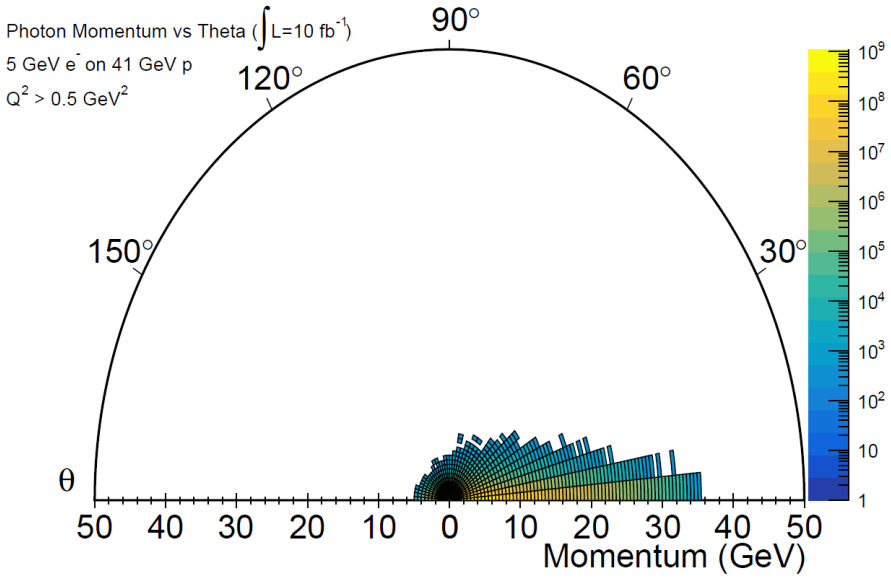


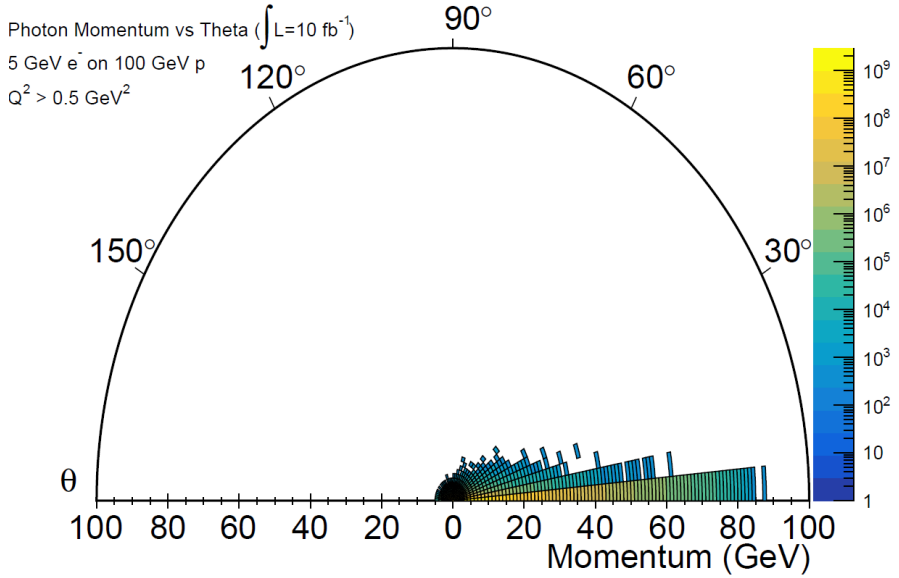
We also display the Protons and Neutrons separately

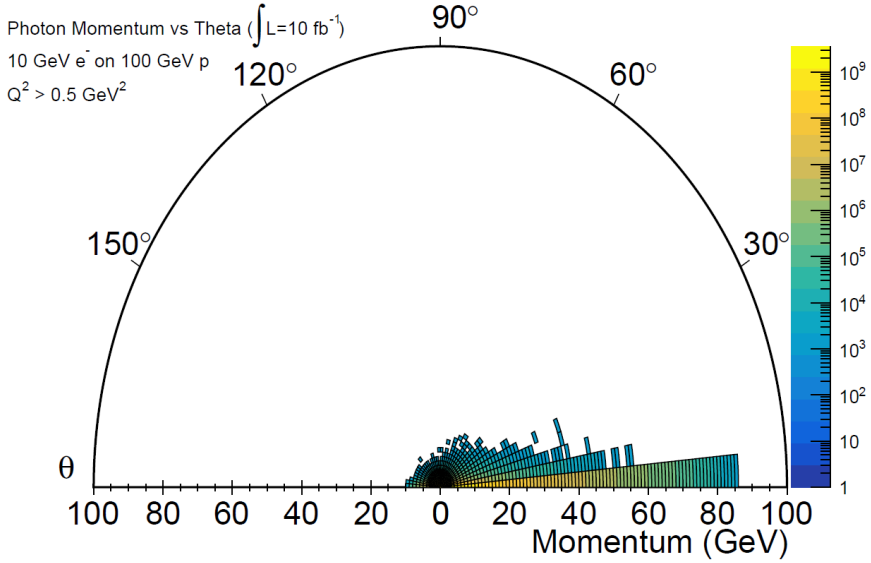


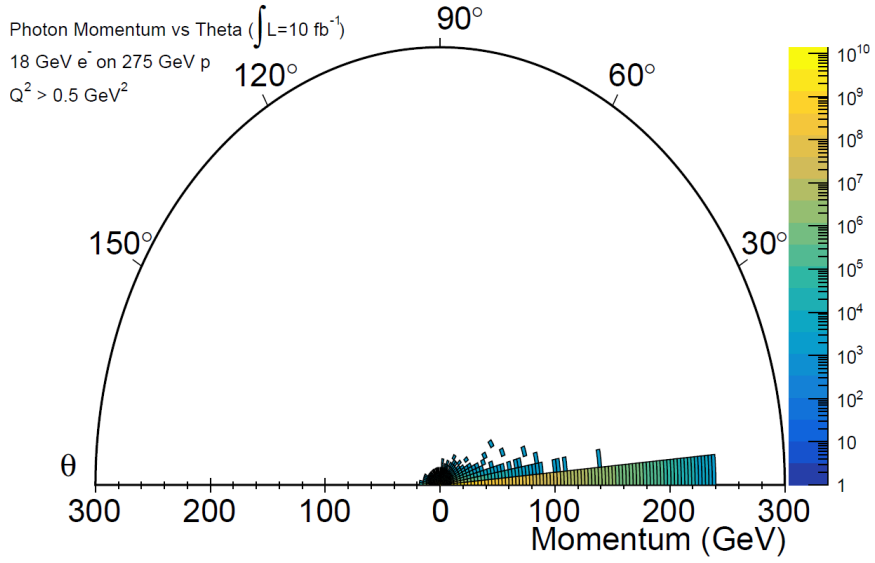


Photon Hit Maps

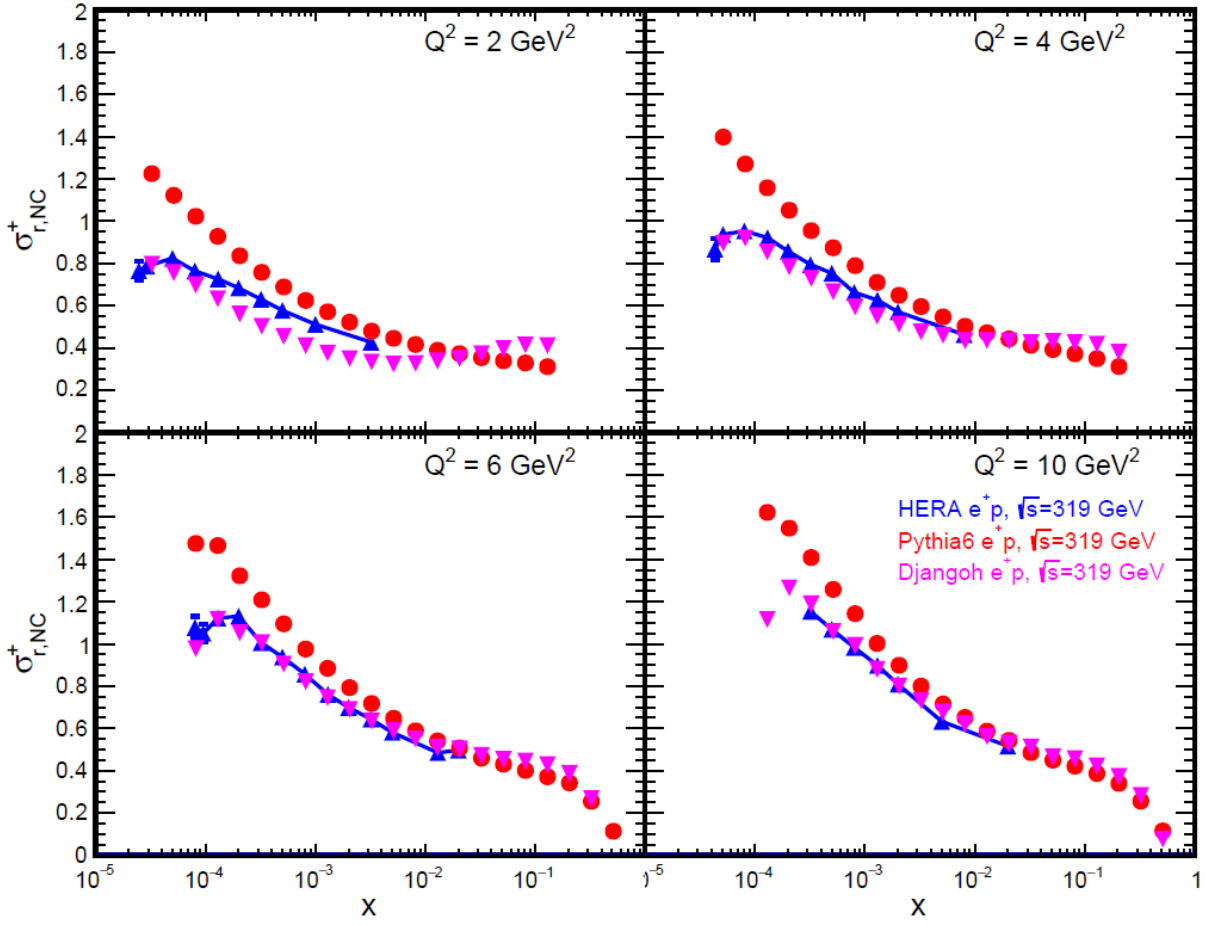








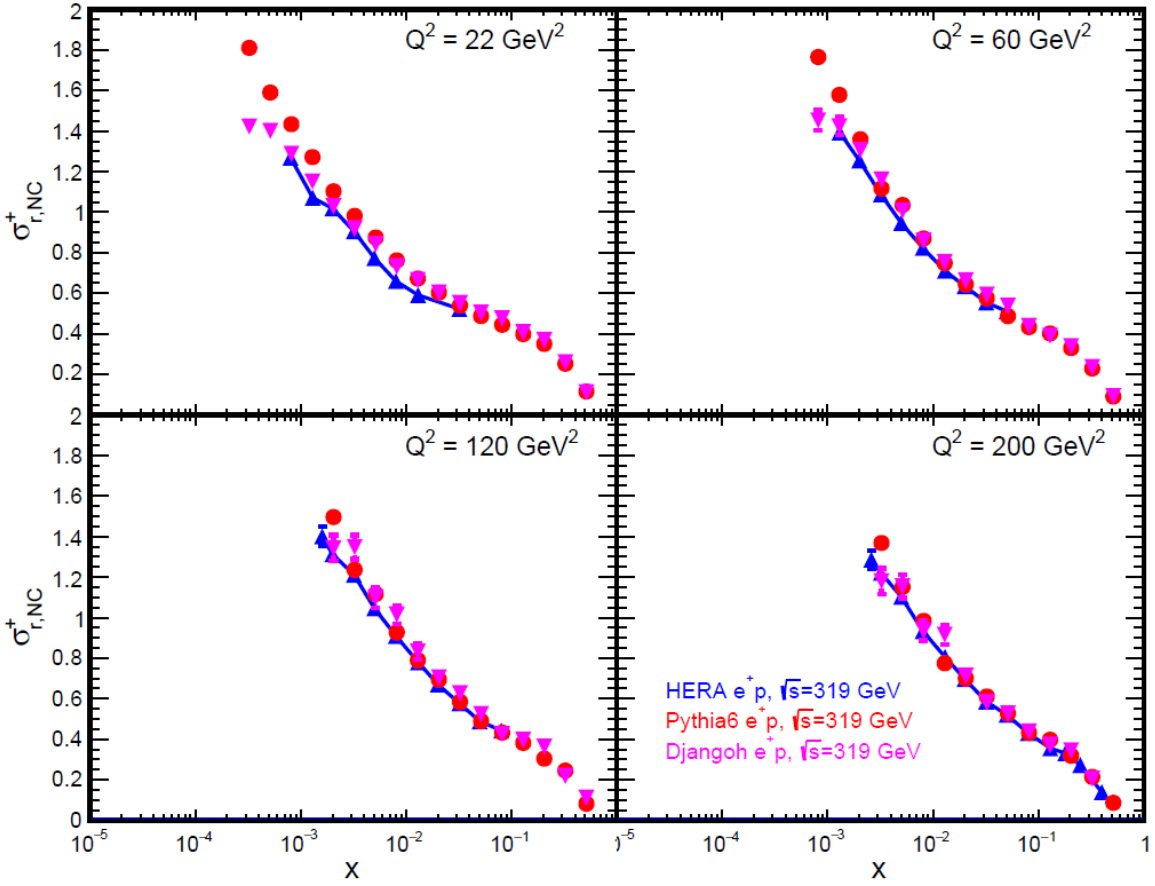
We may want to remake the Hit Maps using *DJANGOH*



DJANGOH **agrees better with low Q^2 (low x) *HERA* data than the *PYTHIA6* tune we are using**

Need to compare to theory predictions at *EIC* Energies

We may want to remake the Hit Maps using *DJANGOH*



Both simulation programs do well at higher Q^2 (higher x)

Conclusions

- We've created NC hit maps using the *PYTHIA6* generator for electron-proton scattering for the 4 required beam energy combinations.
- We may want to remake the plots using the *DJANGOH* generator
- We are now working to recreate these maps assuming a non-zero beam crossing angle (i.e. 25 mRad and 50 mRad). This will be completed this week.
- We also will use the *BeAGLE* event generator to create similar hit maps for eA scattering