Semi-Inclusive Deep Inelastic Scattering Electron Ion Collider Simulations

Douglas W. Higinbotham

Parton Distribution Functions

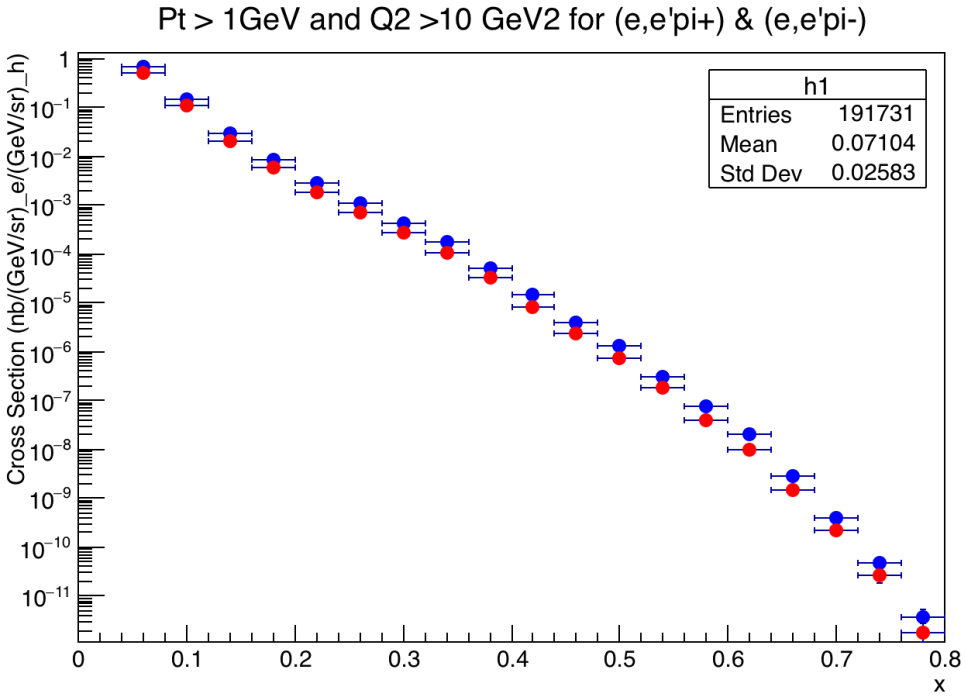
- Using the **LHAPDF6** code (http://arxiv.org/abs/1412.7420)
- Download avaliable at https://lhapdf.hepforge.org/
  - Works on MAC OS X and Redhat Linux
  - 638 validated PDF files! (https://lhapdf.hepforge.org/pdfsets.html)
  - Basically a fast& flexible version of the LHAPDF5 Fortran code

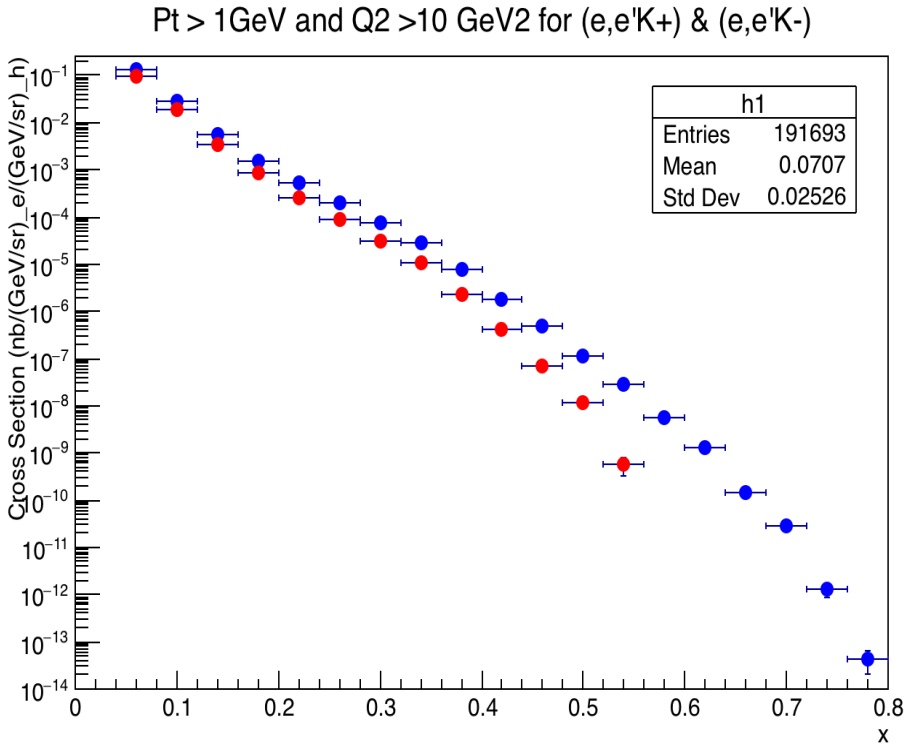
Event Generation Code

- Ended up using a modified version of the SoLID SIDIS event generation code .
- Updated from LHAPDF5 to LHAPDF6 so can handle almost any modern PDF function and also *should be* significantly faster.
- Kinematics are updated to handle EIC kinematics
  - NOTE: Beams have been approximated to be head-on.
- Generated ROOT Trees for (e,e'pi+), (e,e'pi-), (e,e'K+), and (e,e'K-)
  - Fixed target 10 GeV
  - Collider 10 GeV electron on 10 GeV proton
  - Collider 10 GeV electron on 100 GeV proton
- Can easily generate different kinematics with 250k events in a few hours
- Also can generate standard ASCII LUND event files.

10 GeV electron on 100 GeV proton

Blue positive particles, Red negative particles





Used CT10nlo PDF for these cross section calculations.