Kinematic coverage of current *PYTHIA8* samples

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Current *ATHENA* full simulation samples

- The currently available full simulation samples are created using the *PYTHIA8* event generator.
- The event generator setting come from the code shown on the right.
- I used these setting and checked how the events populate the x-Q^2 kinematic phase space.

https://github.com/bspage912/eicSimuBeamEffects

master · eicSimuBeamEffects / Pythia8 / steerFiles / dis_eicBeam_hiDiv_18x275

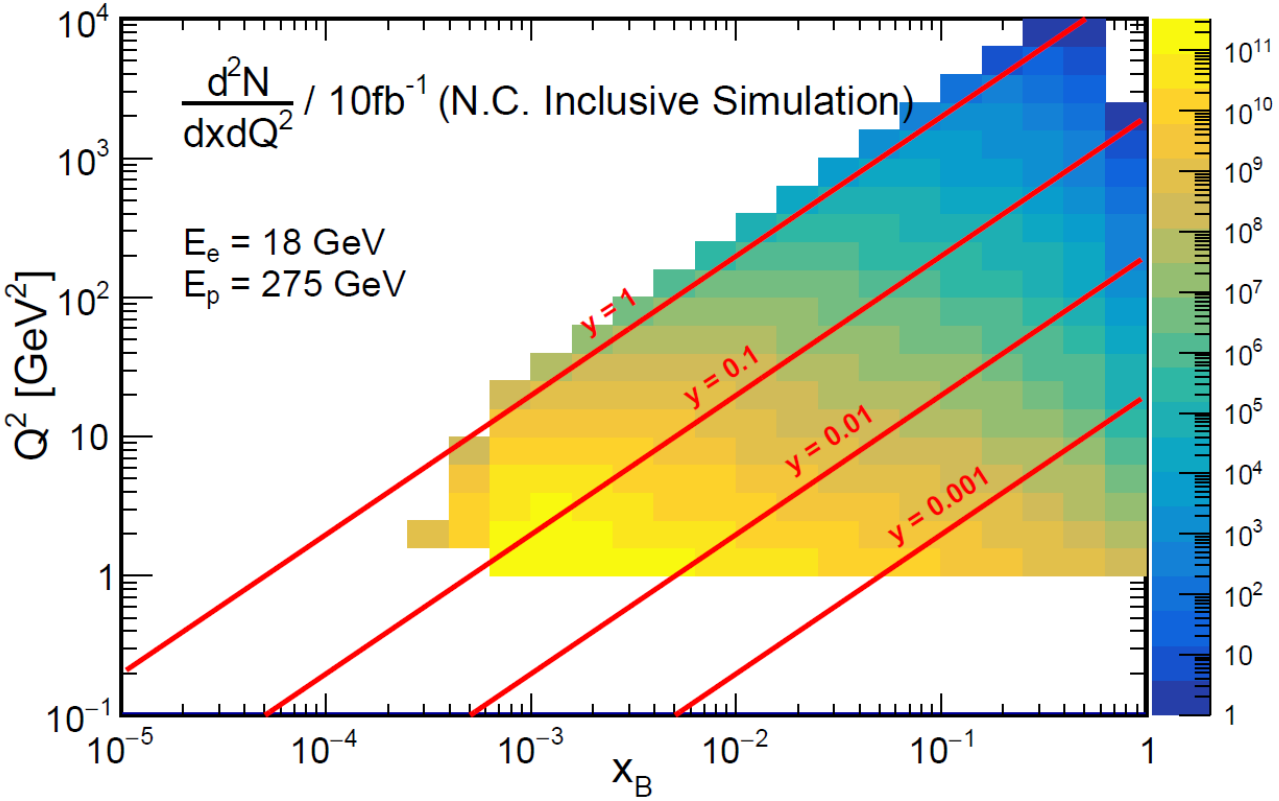
bspage912 Changed the seed for the random number generator in all steering file...

1 contributor

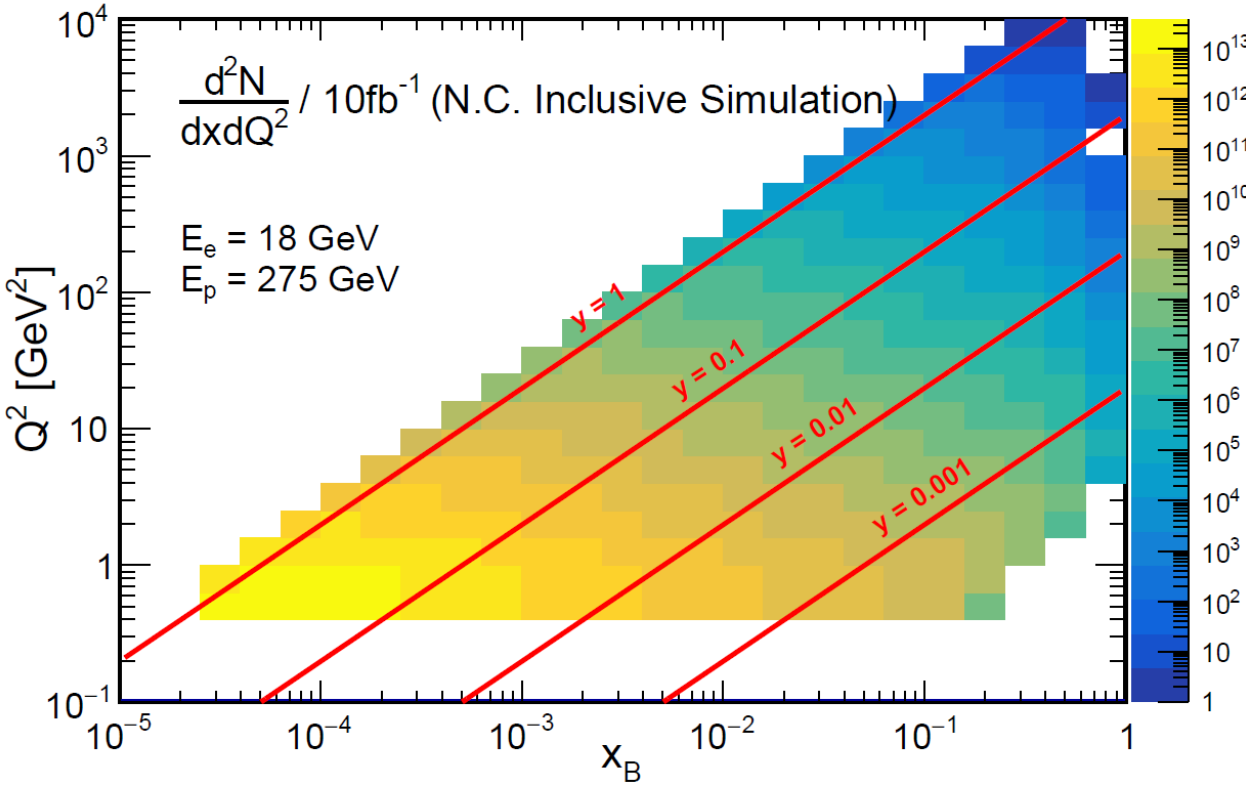
101 lines (76 sloc) | 1.54 KB

```
/*
Steering file for LO DIS with realistic EIC beam parameters
18x275 in High Divergence Mode
See CDR Table 3.3
*/

Main:numberOfEvents = 1000000


/*
Beam Parameters
*/

Beams:frameType = 2
Beams:idA = 2212
Beams:idB = 11

Beams:allowMomentumSpread = on
Beams:sigmapxA = 0.000150
Beams:sigmapyA = 0.000150
Beams:sigmapzA = 0.00068

Beams:sigmapxB = 0.000202
Beams:sigmapyB = 0.000187
Beams:sigmapzB = 0.00109

Beams:allowVertexSpread = on
Beams:sigmaVertexX = 0.084
Beams:sigmaVertexY = 0.008
Beams:sigmaVertexZ = 0.0


/*
PDF Selection 2 = CTEQ5L
PDF:GammaHardSet needed to try SAS Photon set, LHAPDF5 isn't linked yet ...
PDF:extrapolate = on allow extrapolations to low x
*/
PDF:pset = 2
PDF:lepton = off


/*
Subprocess Selection
*/
WeakBosonExchange:ff2ff(t:gmZ) = on
```

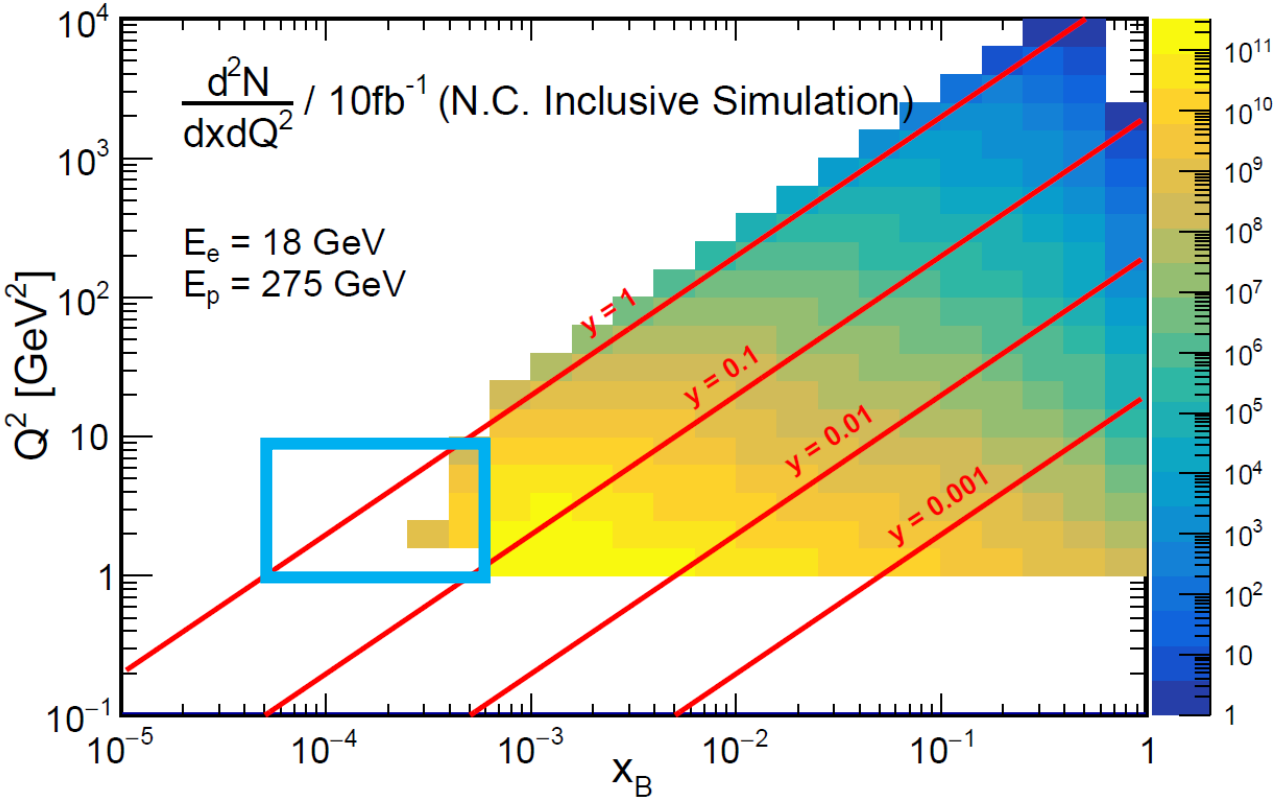
PYTHIA8



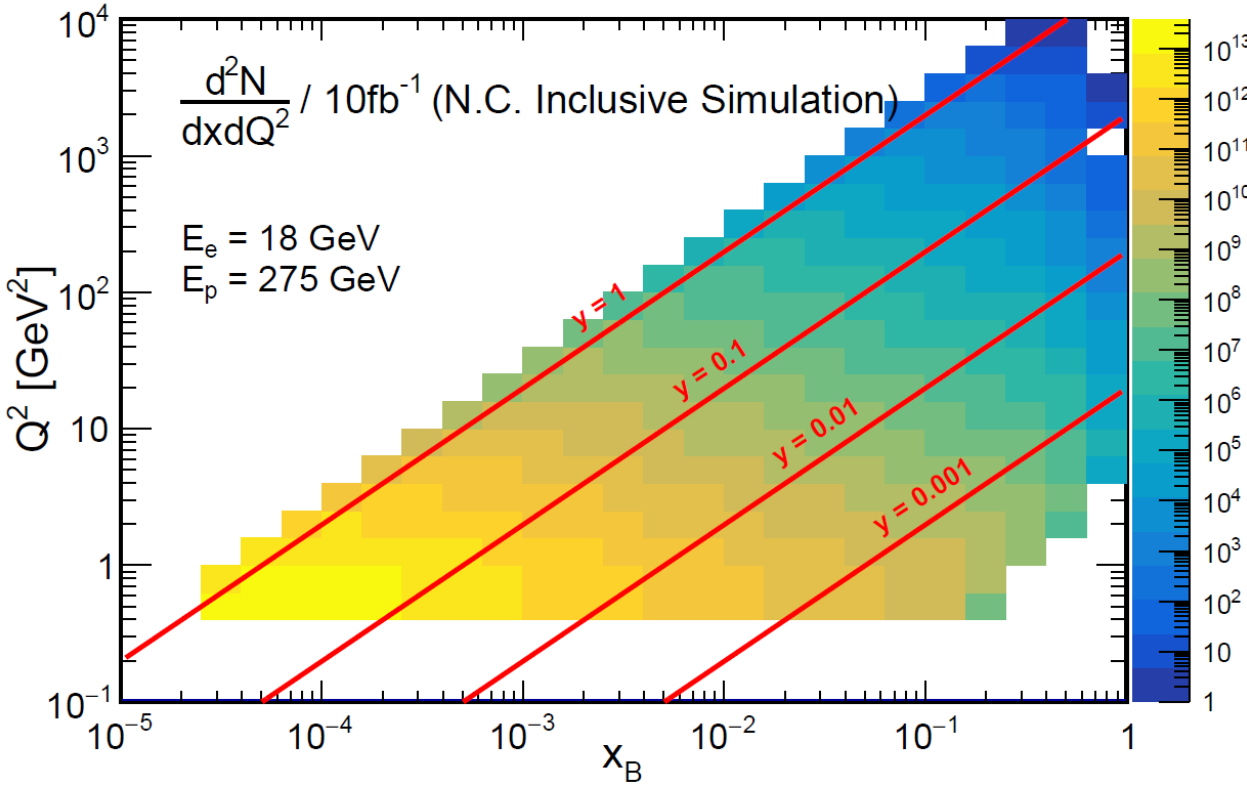
PYTHIA6



PYTHIA8



PYTHIA6



Current PYTHIA8 settings are not populating the low x-Q^2 region. Setting *PDF:extrapolate = on* did not have any affect.

Conclusions

- Current *ATHENA* full simulation inclusive samples have been generated using *PYTHIA8*.
- These samples are fine for our first set of analyses.
- For the final proposal plots, we need to either fix these issues at low x and Q^2, or use some of the currently-available PYTHIA6 or DJANGOH samples.