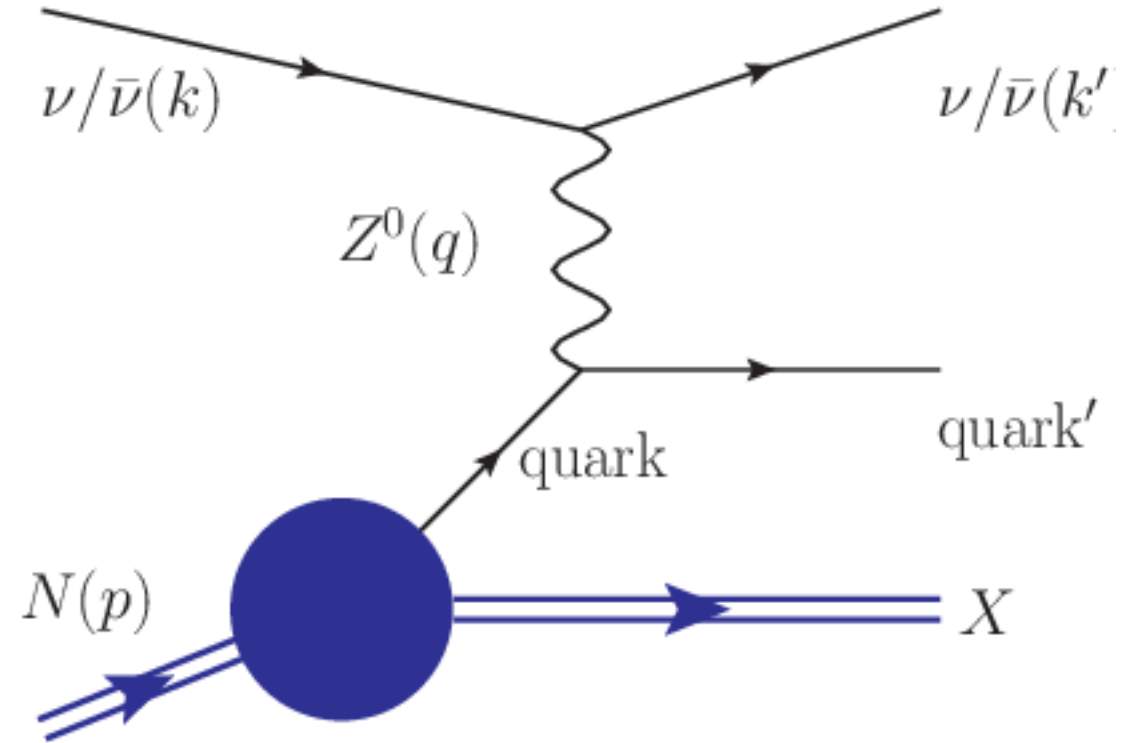


# Effect on nHCal in Event Level Kinematics

Xihe Han

# Background

- Event inelasticity ( $y$ ):
- $y \equiv \frac{p \cdot q}{p \cdot k}$
- Need scattered electron kinematics
  - Not guaranteed, and not possible for charged current
- Or estimate it with the hadronic final states  $y_{JB}$  where:
- $y_{JB} \approx \sum_h \frac{E_h - p_{z,h}}{2E_e}$

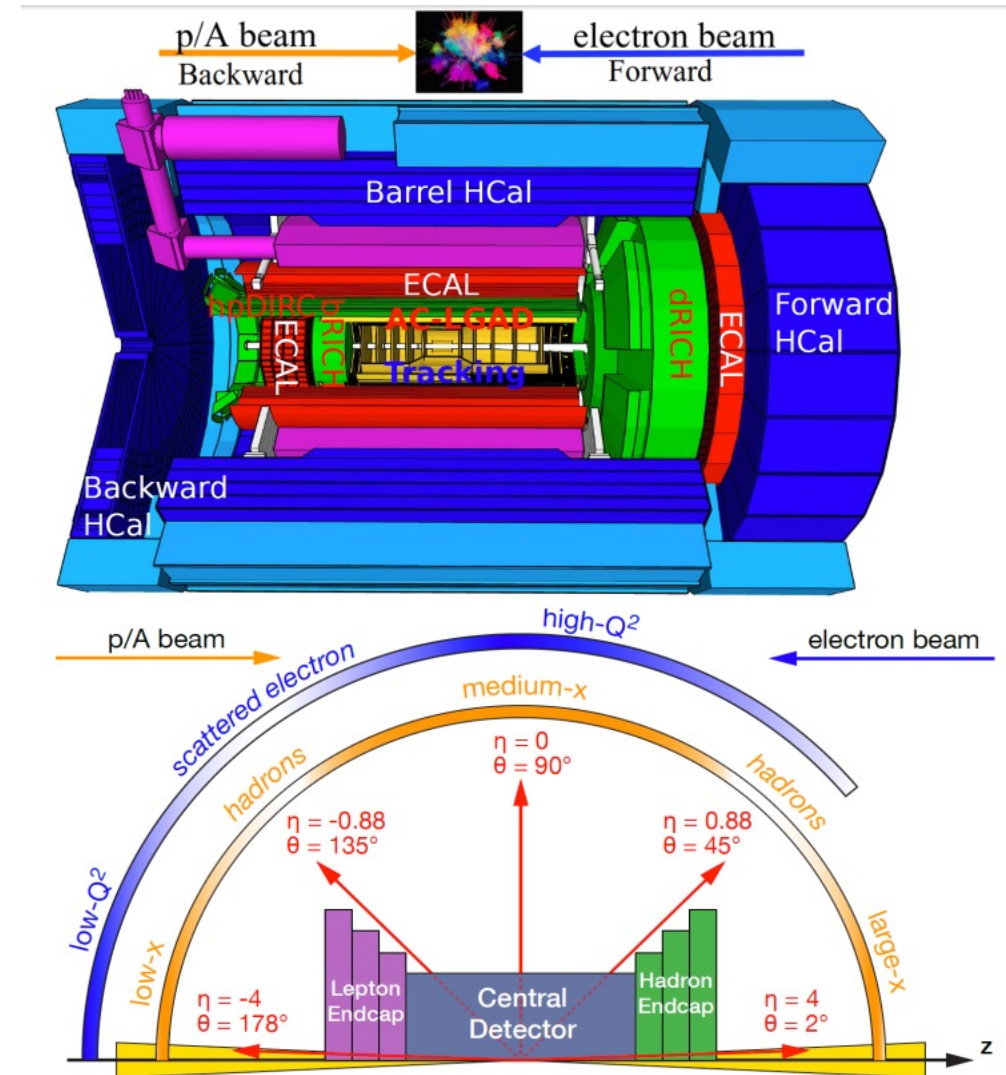


# Expectations

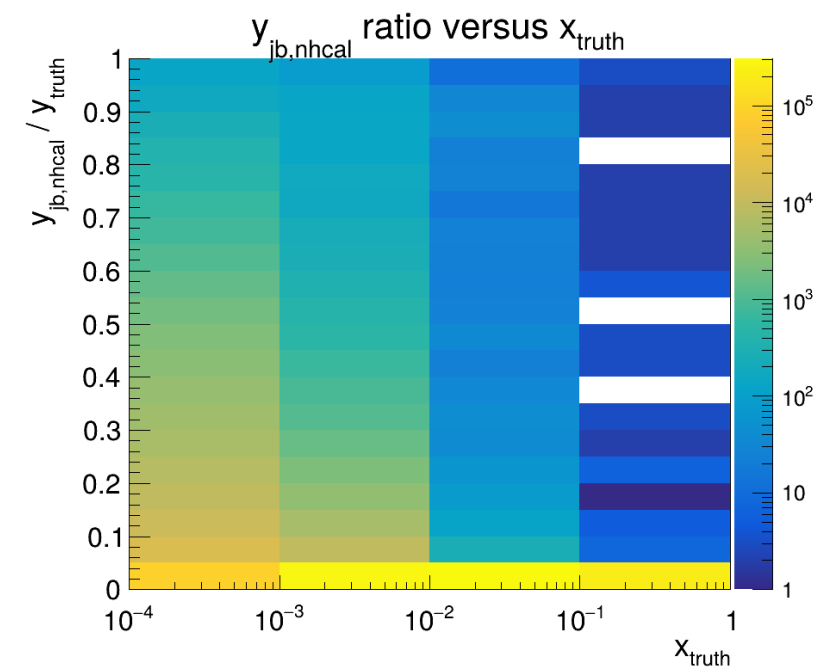
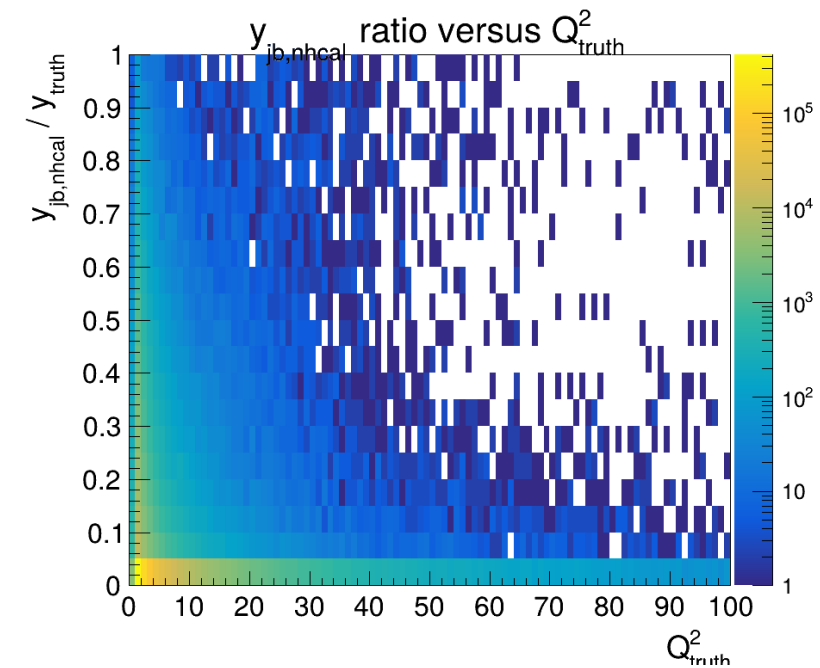
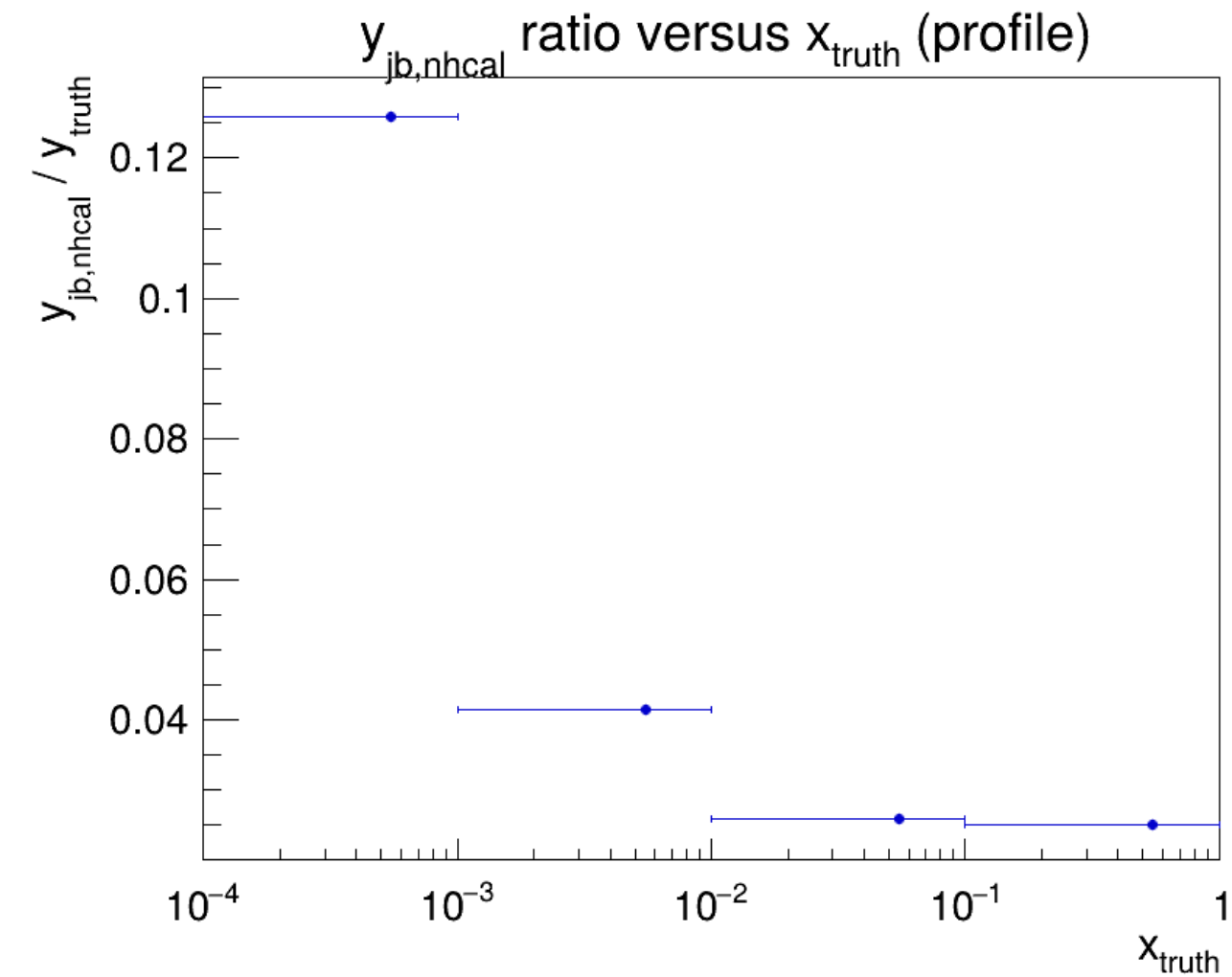
- nHCal should have a higher impact in the backward direction.
  - This corresponds to low- $x$  and low- $Q^2$

## This study:

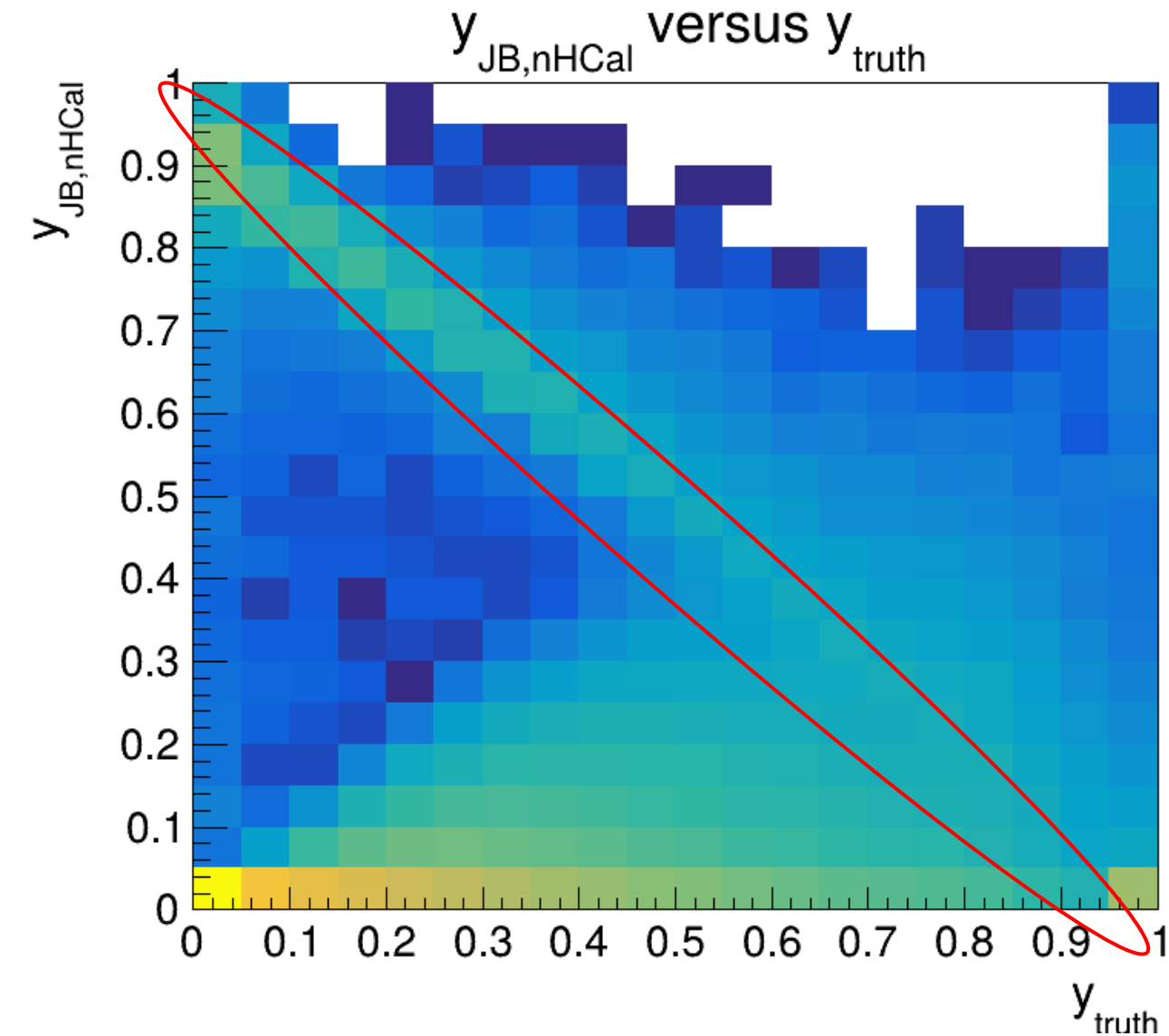
- Use NC DIS event as input, run npsim and eicrecon
  - `pythia8NCDIS_18x275_minQ2=1_beamEffects_xAngle=-0.025_hiDiv_1.hepmc`
- Study the contribution of  $y_{JB}$  from neutral hadrons that end up in the nHCal acceptance ( $-4.16 < \eta < -1.16$ )
- Currently does **not** require track matching



# Results



# Some bugs...



Wrong pz sign?

Using FinalStateHadron to match to ReconstructedParticles  
so beam particles should be already excluded.

# Next steps

- Check CC events
- Check eA events generated by BEAGLE
- Manual calorimeter hit- track matching from Leszek.