

A look at identified particle production at EIC

Roberto Preghenella

From the EIC White Paper

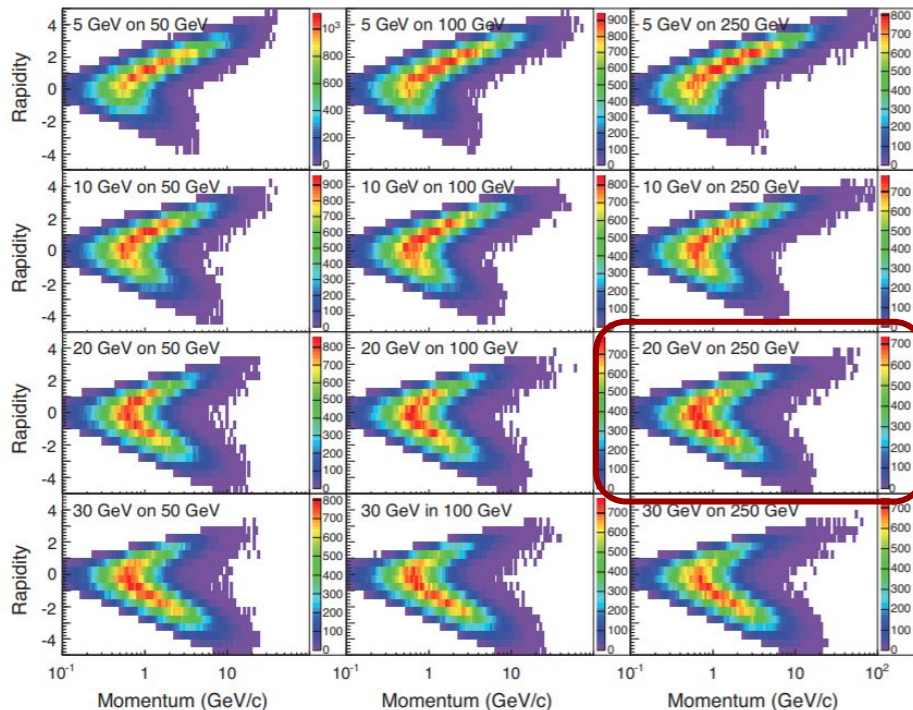


Figure 6.2: Momentum vs. rapidity in the laboratory frame for pions from non-exclusive reactions. The following cuts have been applied: $Q^2 > 1 \text{ GeV}^2$, $0.01 < y < 0.95$, $0.1 < z$ and $-5 < \text{rapidity} < 5$

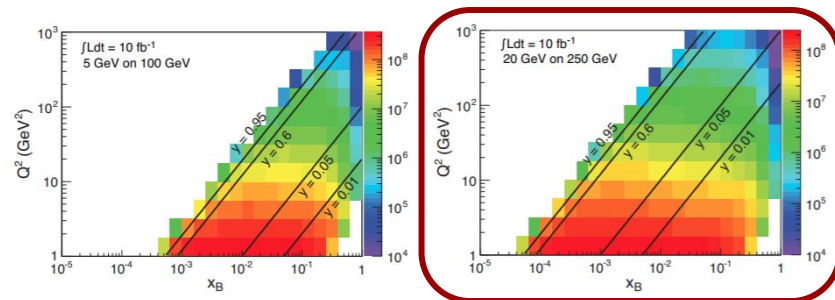
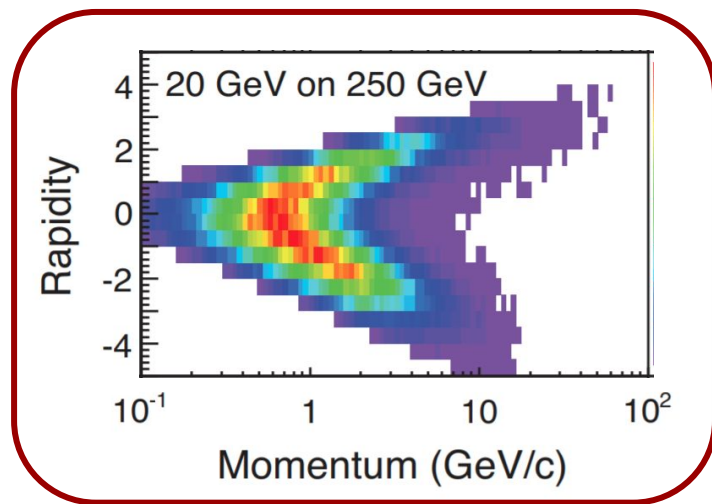


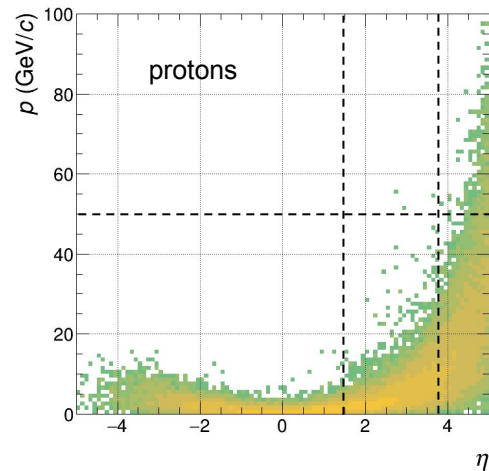
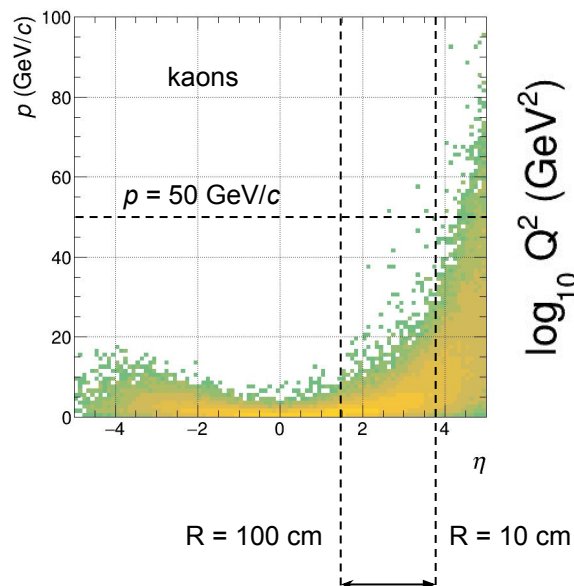
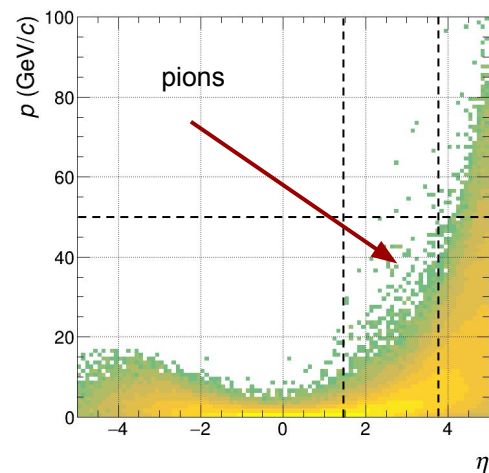
Figure 6.1: The $x - Q^2$ plane for center-of-mass energy 45 GeV (left) and 140 GeV (right). The black lines indicate different y -cuts placed on the scattered lepton kinematics.



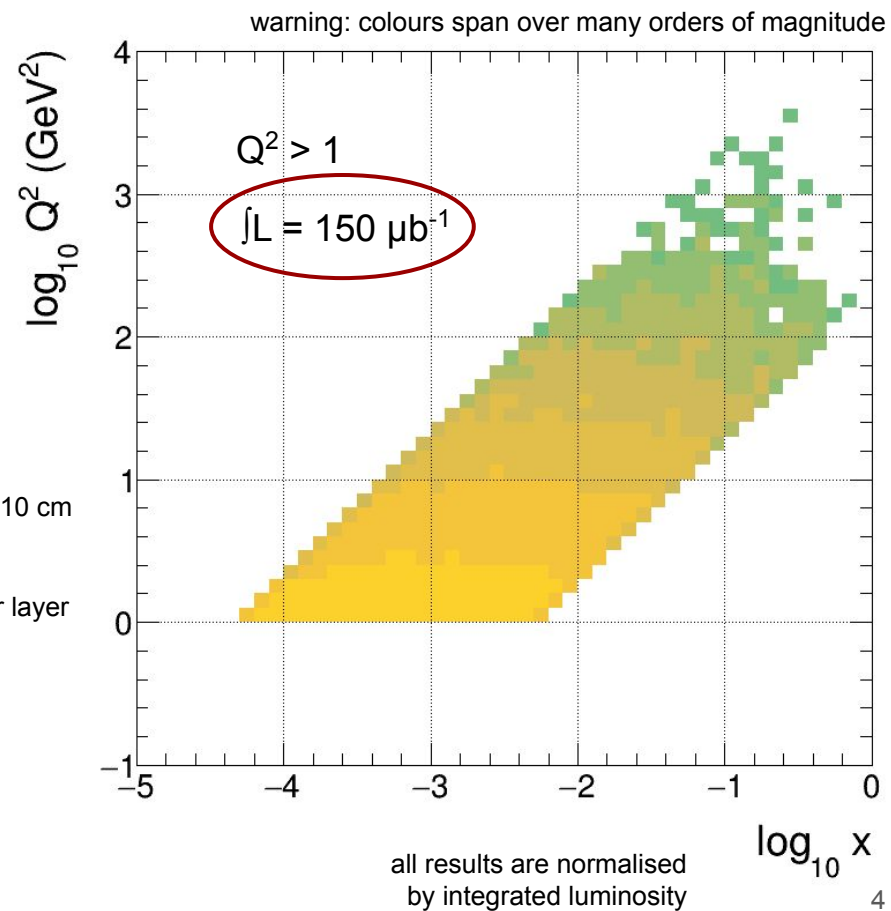
Monte Carlo settings

- Pythia6 v6.428
- **eRHIC** beam settings
- p_{electron} **20 GeV/c**
- p_{proton} **250 GeV/c**
- zero crossing angle
- \sqrt{s} 140 GeV
- all QCD processes
- PDF CT10
- $0.01 < y < 0.95$
- several MC samples
- inclusive DIS, $Q^2 > 1$
- Q^2 biased to increase integrated luminosity
- HepMC interface to Pythia6
- Delphes translation to ROOT tree
- ROOT analysis
- analysis performed on **MC truth**
- x , Q^2 computed from scattered electron
- pion, kaon and proton ideal identification
- no momentum smearing
- **no detector effects**
- nothing special ...
- just look at where particles are produced in the phase space

Inclusive DIS sample: $Q^2 > 1$

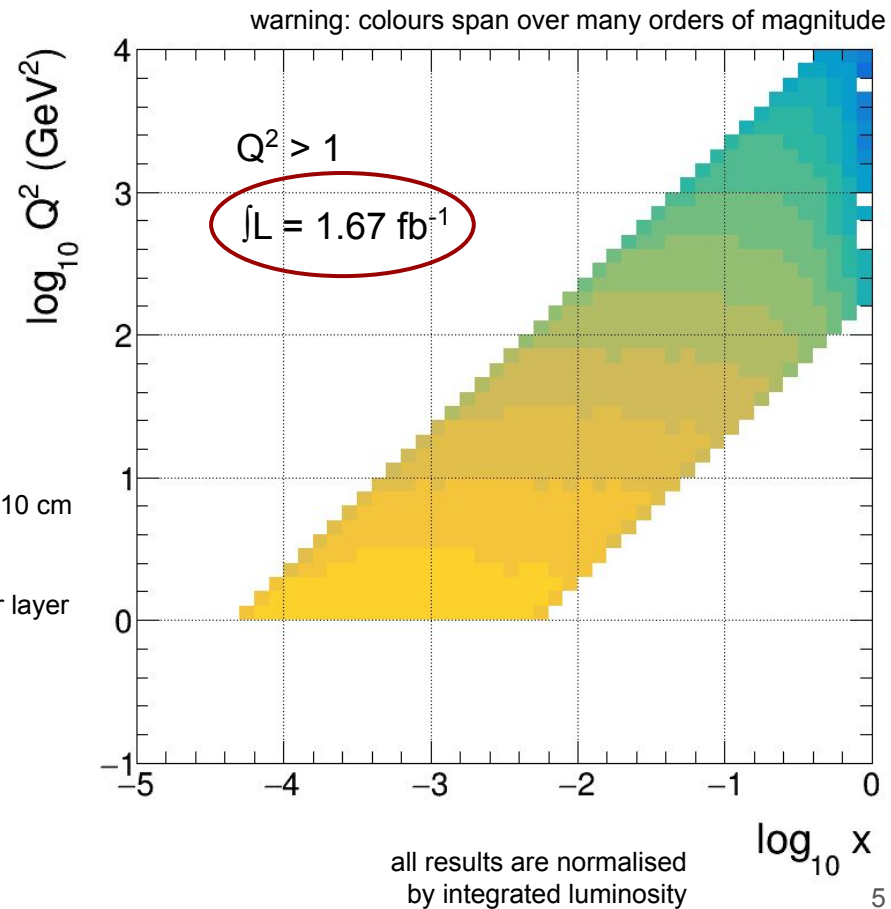
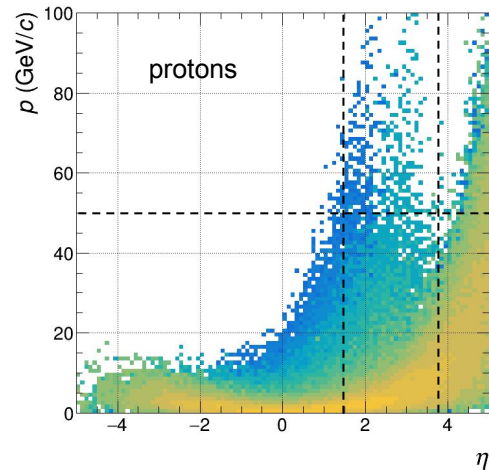
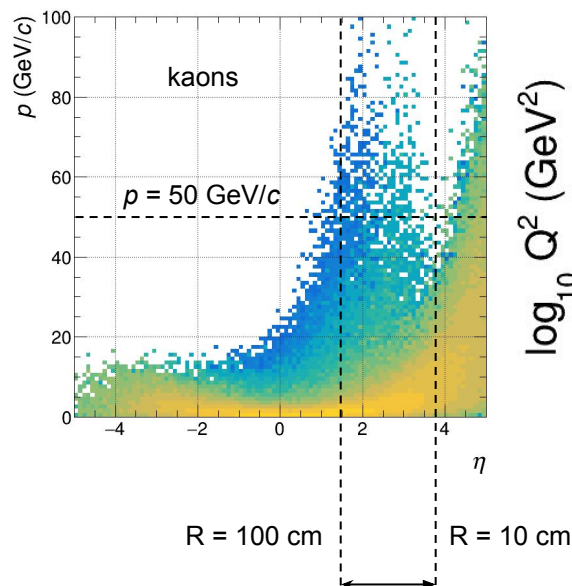
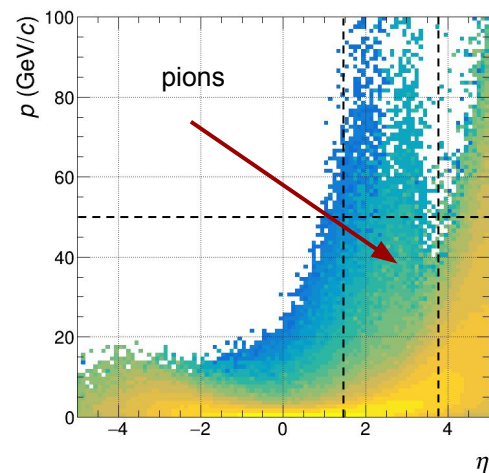


approximate acceptance of a detector layer
located at **200 cm from the IP**

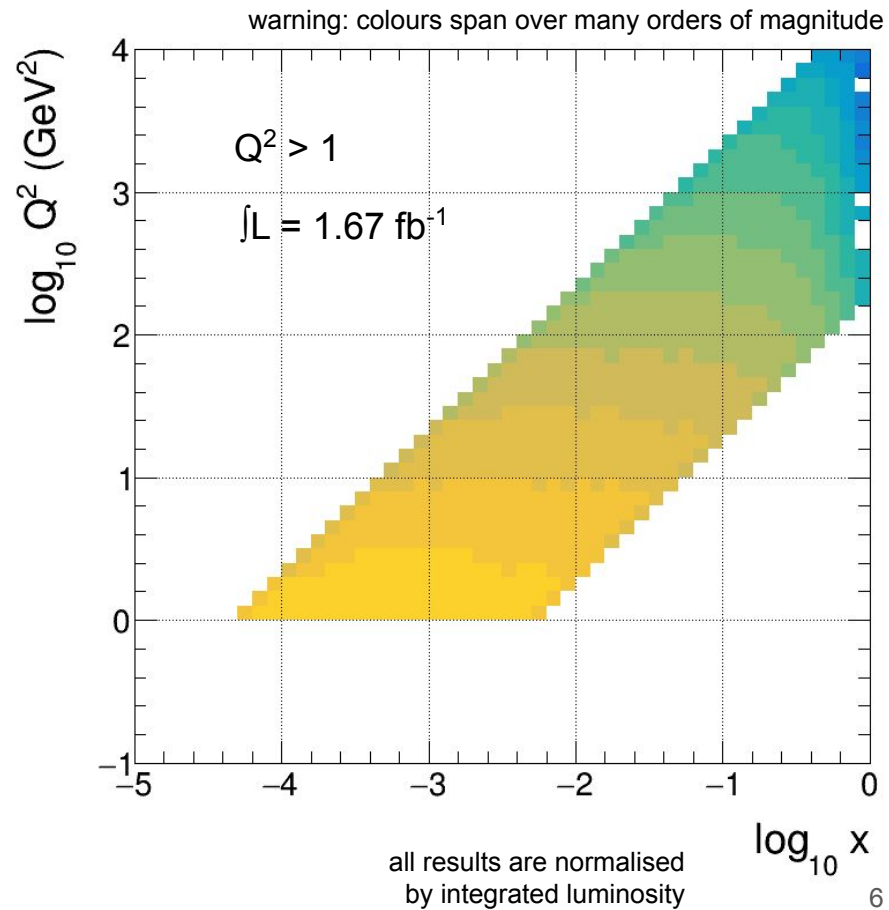
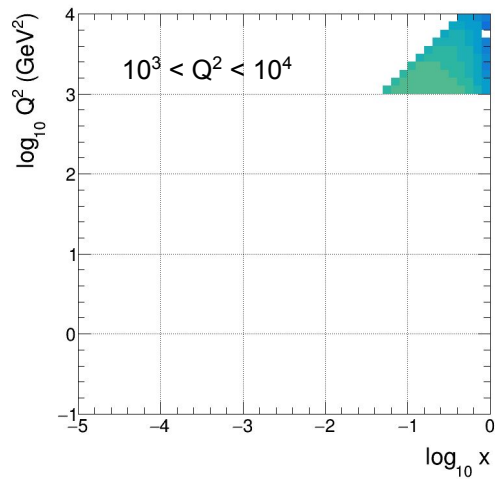
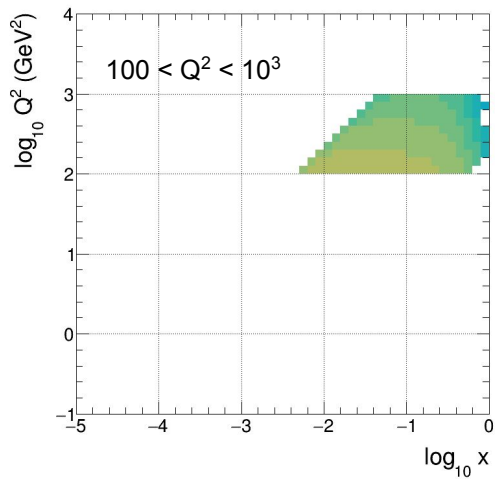
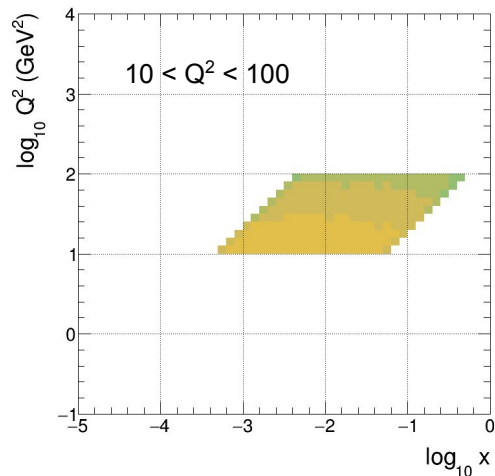
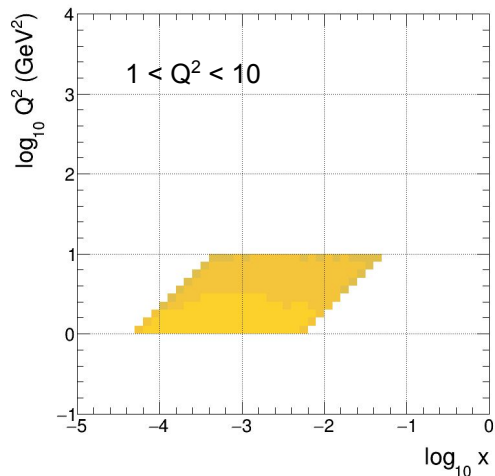


all results are normalised
by integrated luminosity

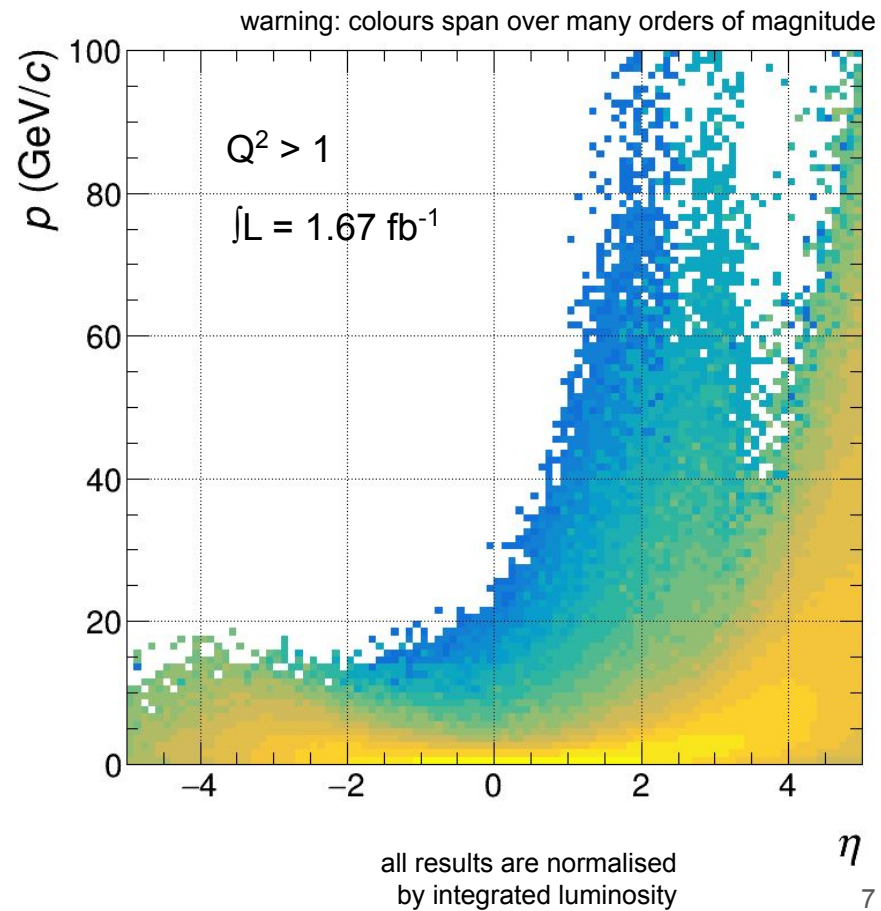
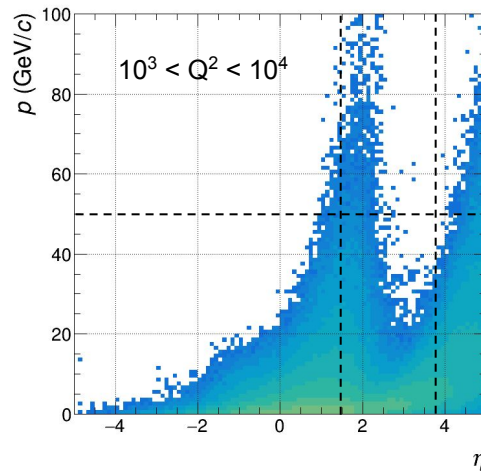
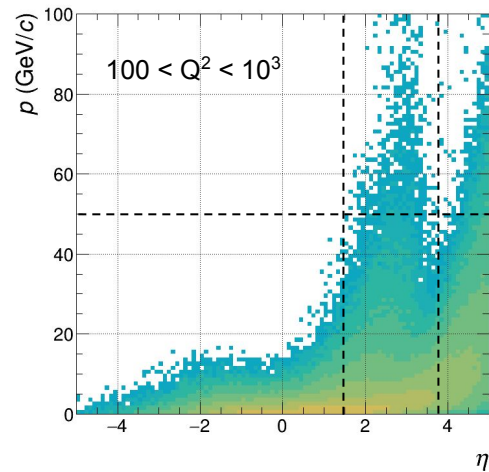
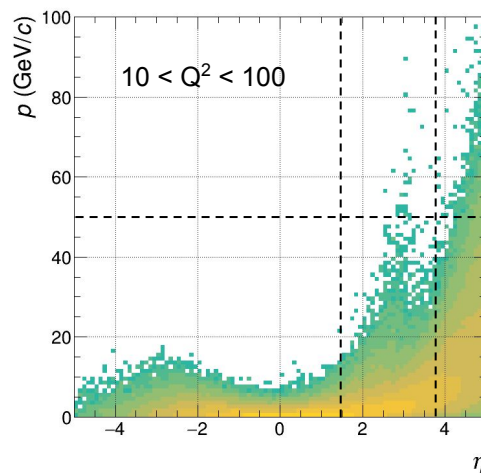
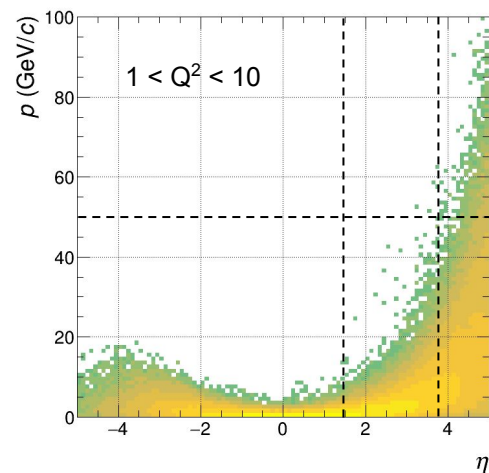
Q^2 biased sample



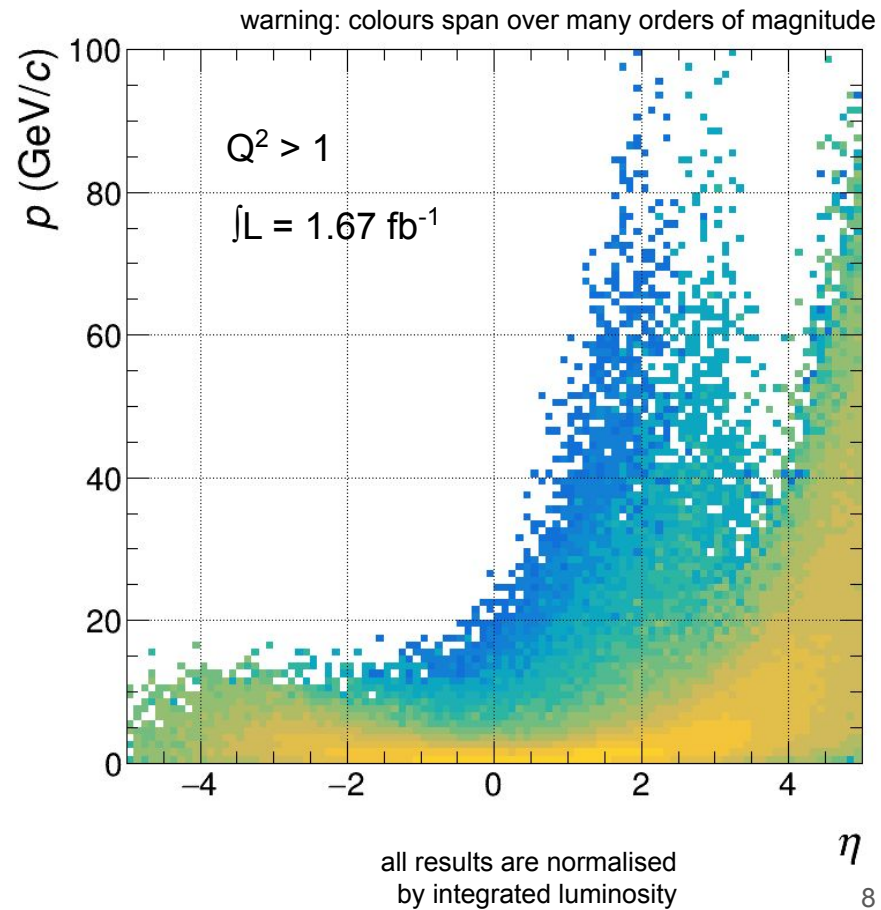
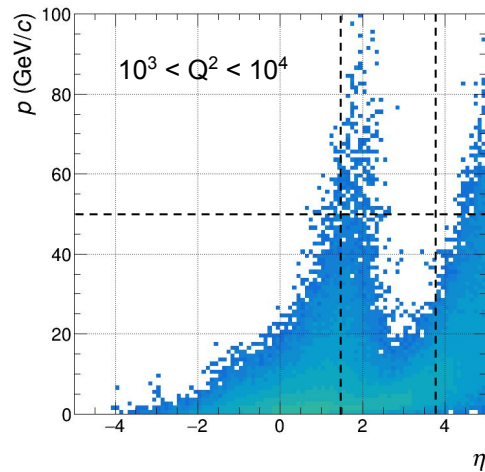
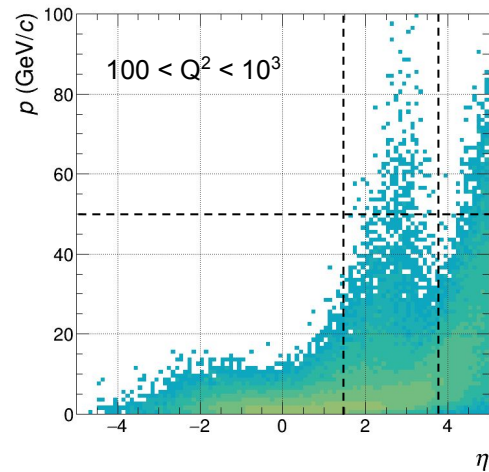
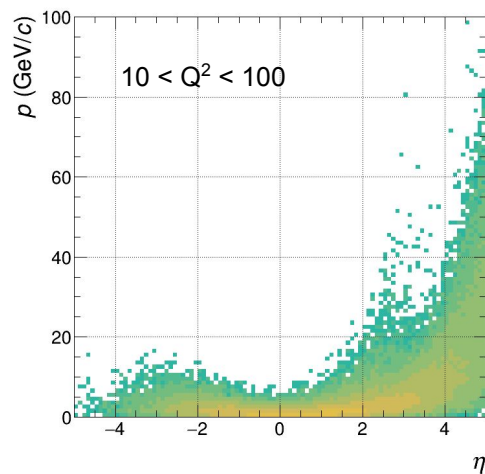
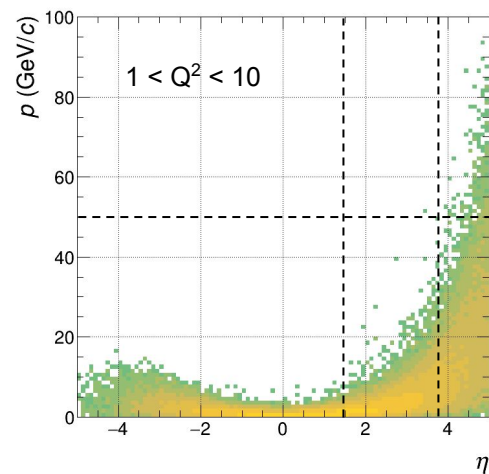
Construction of Q^2 biased sample



Pions at different Q^2



Kaons at different Q^2



Protons at different Q^2

