DVCS and π^0

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Input parameters

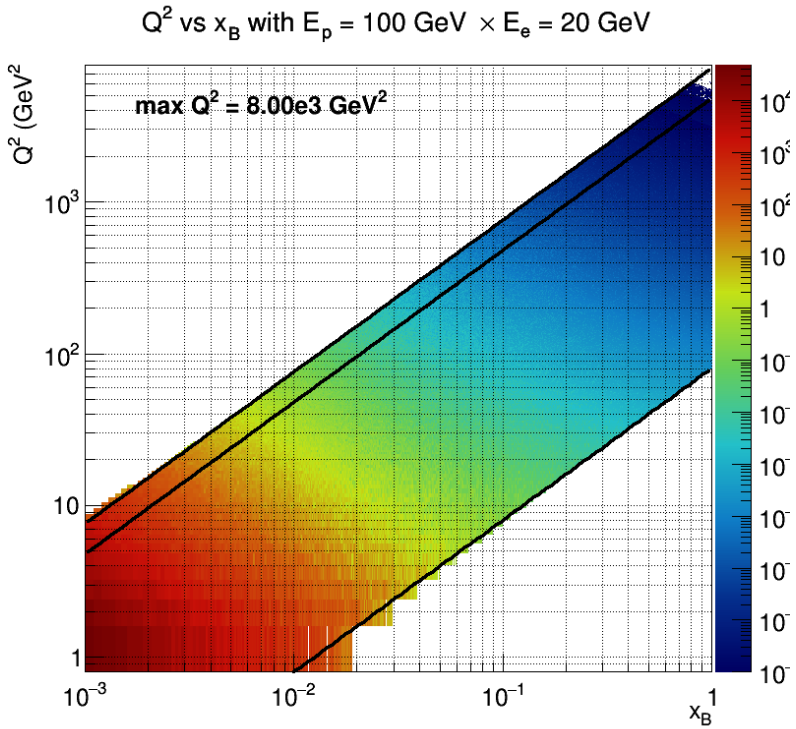
Scenarios 18 GeV $\times$ 275 GeV, 10 GeV $\times$ 100 GeV and 5 GeV $\times$ 40 GeV

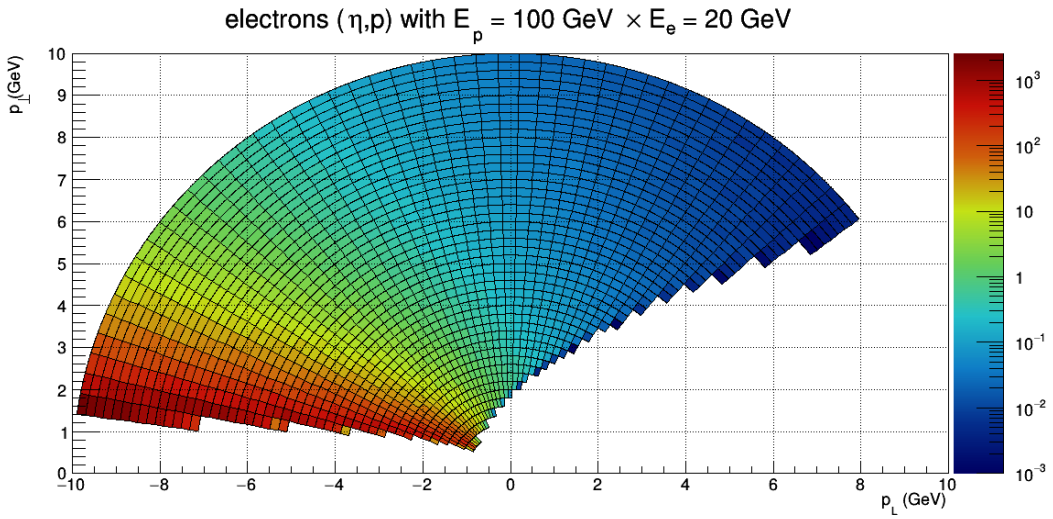
Input: Electron-Ion Collider Detector Requirements and R&D Handbook v1.1 Jan 10th 2019 available **here**

`http://eicug.org/web/sites/default/files/EIC_HANDBOOK_v1.1.pdf`

Investigating photons resolutions, in particular calorimeter granularity

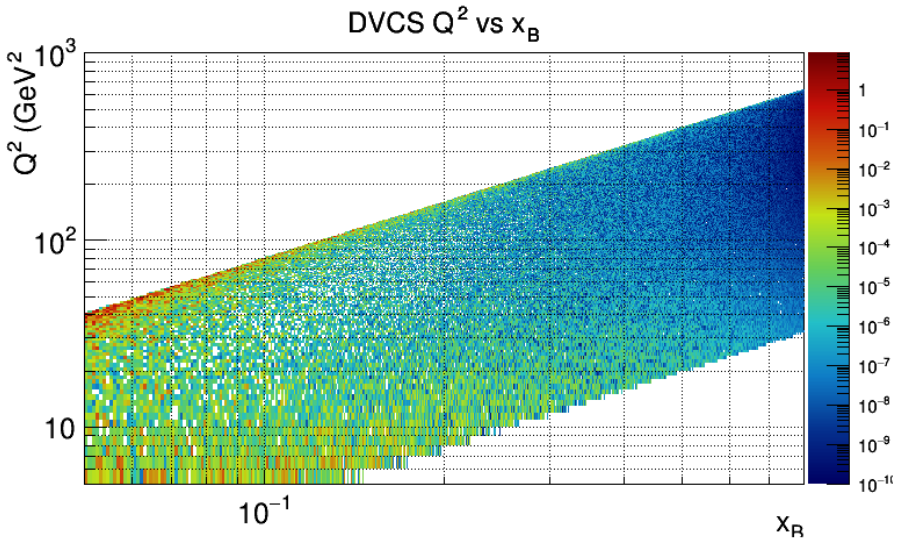
Electron DIS kinematics scenario 2

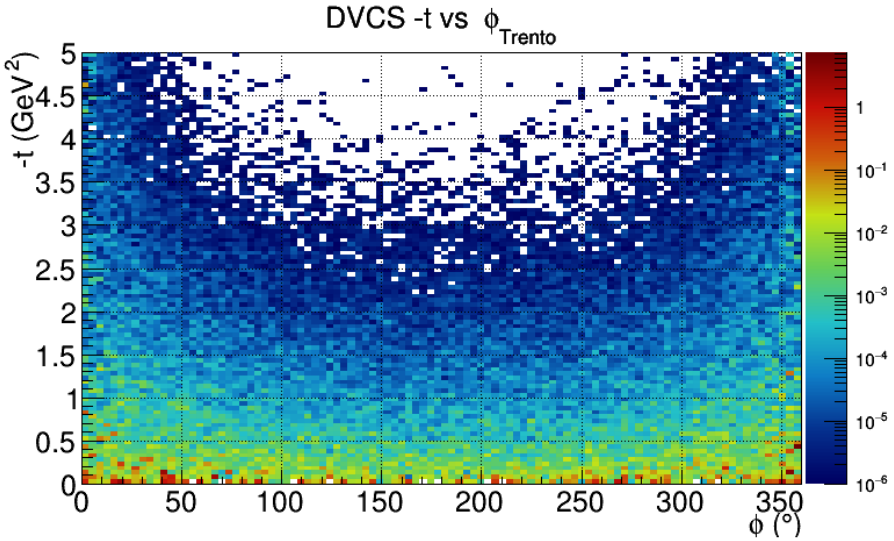




Intermediate energy scenario

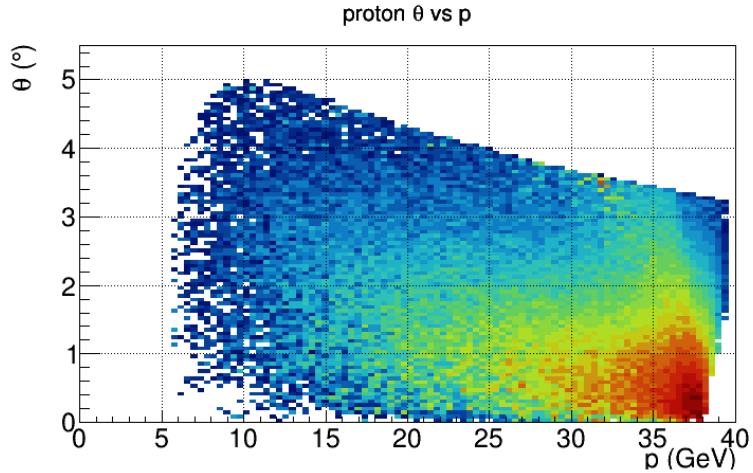
DVCS 5 GeV $\times$ 40 GeV

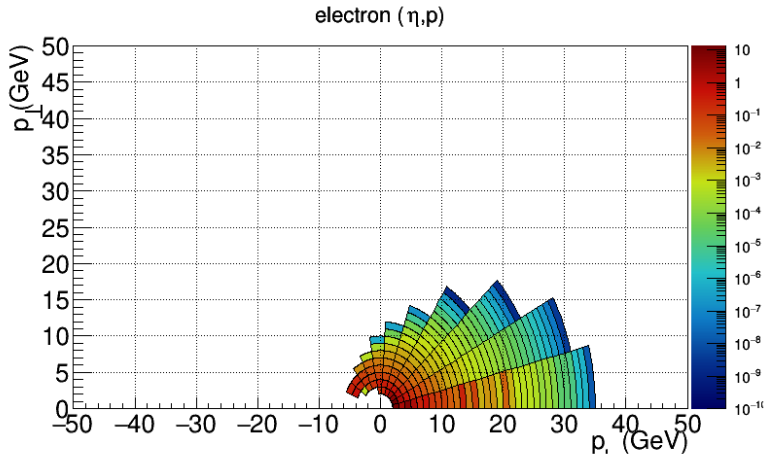


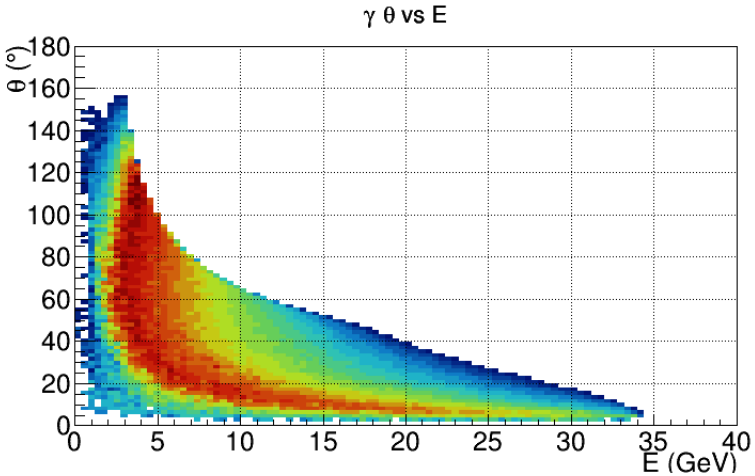


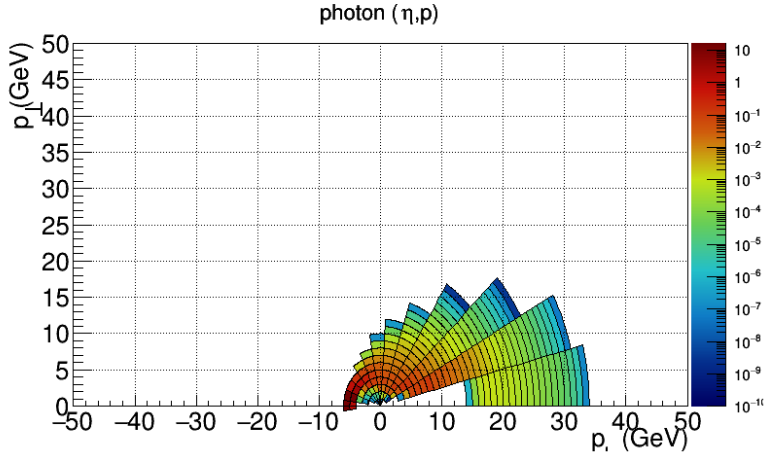
Coverage focused on high x_B and high Q^2
(mostly to save time now)
$-t$ extends to high values but dominated by low range

Electrons and photons 5 GeV $\times$ 40 GeV



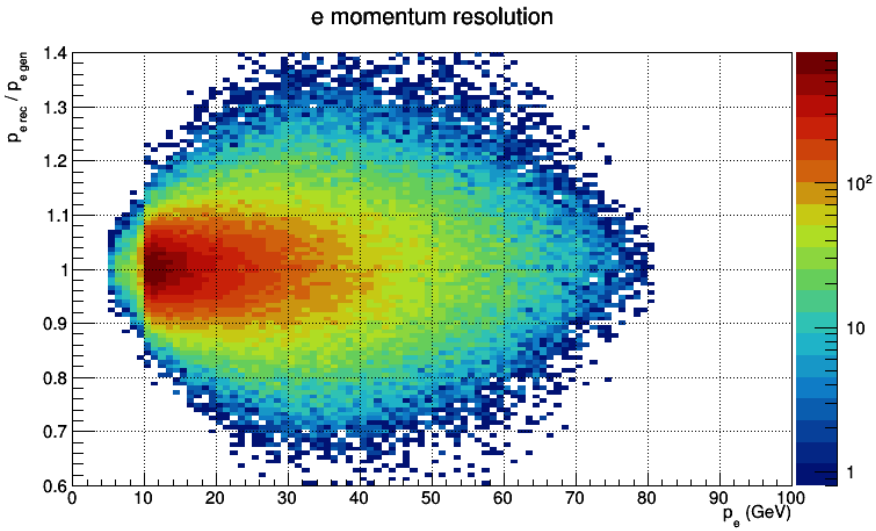


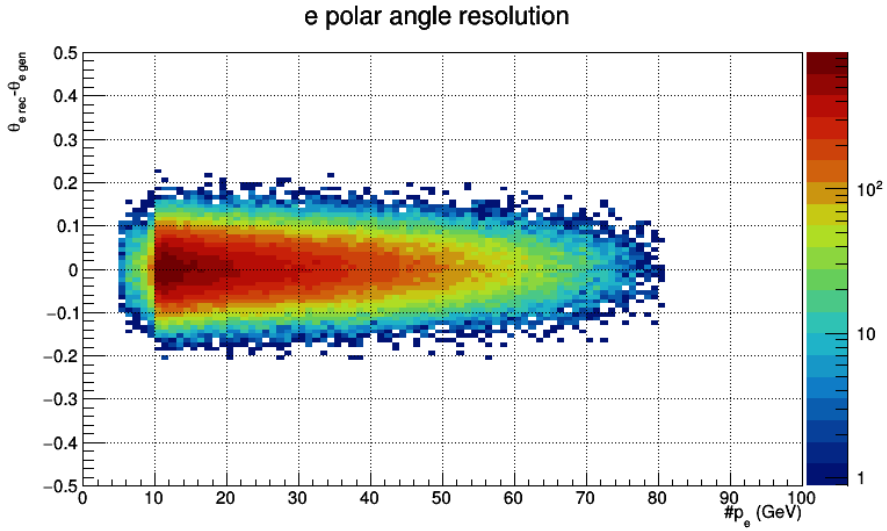


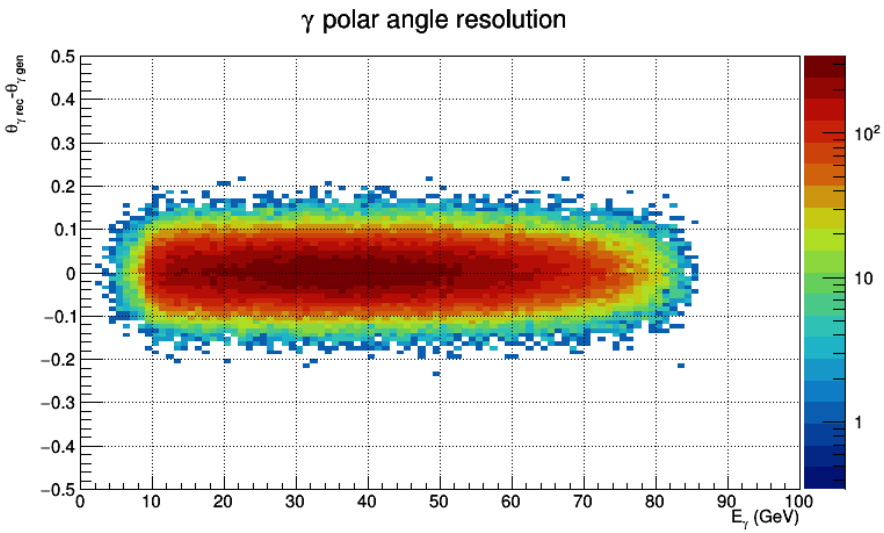


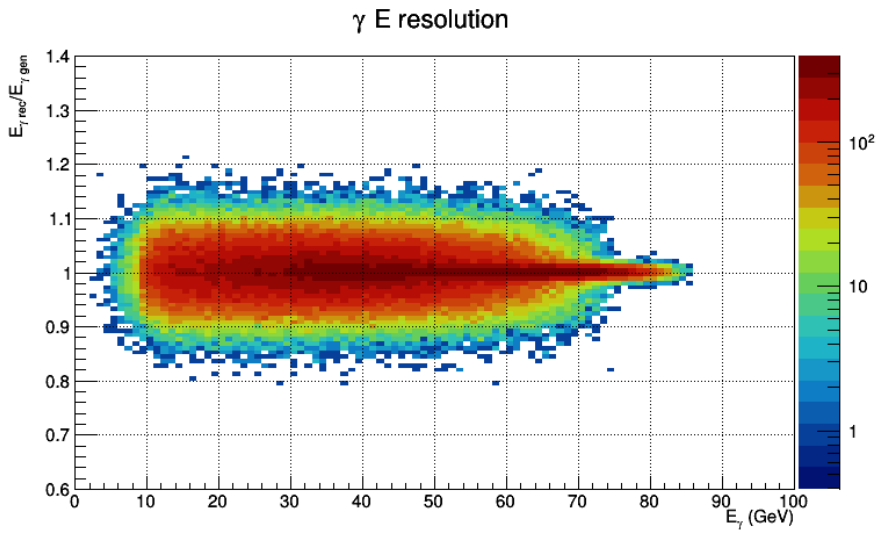
Single particle resolutiosns

10 GeV $\times$ 100 GeV



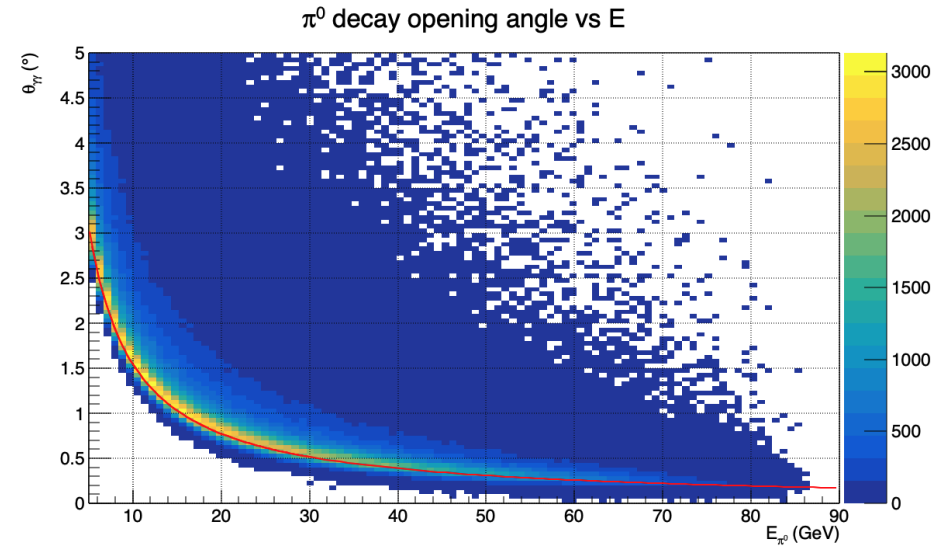




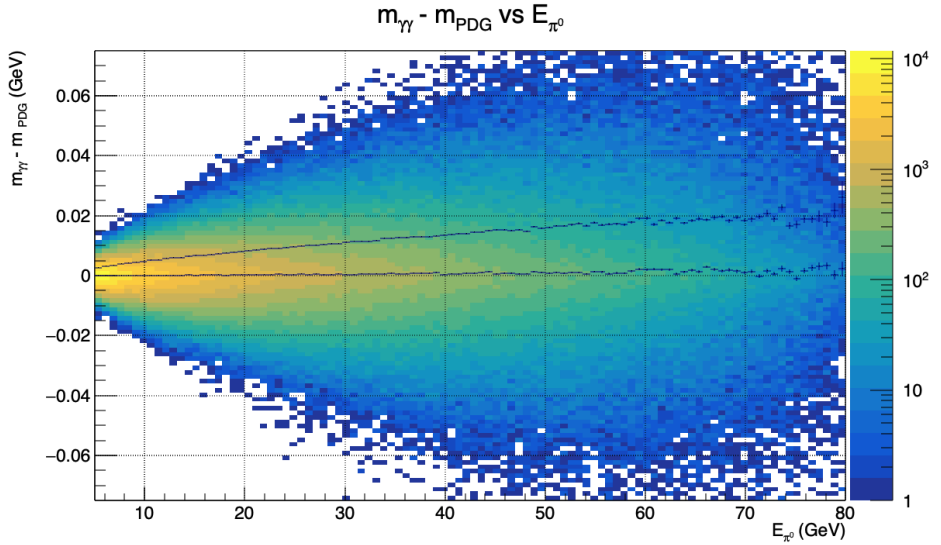


π^0 decay at 10 GeV $\times$ 100 GeV

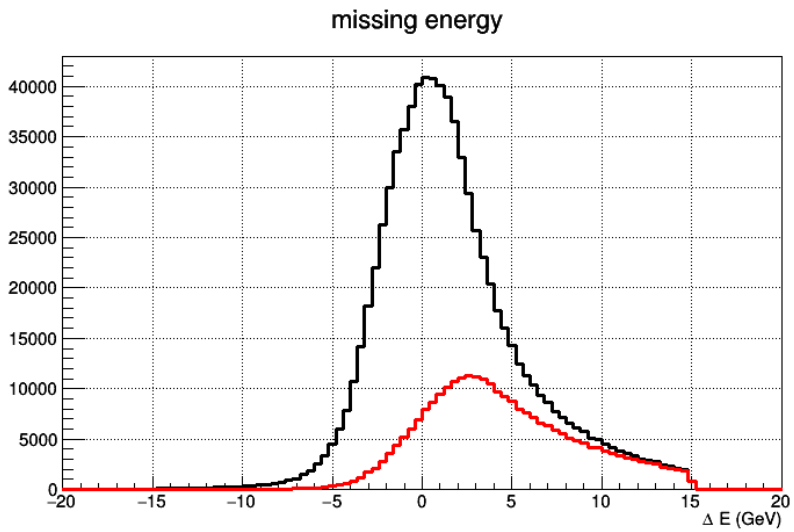
Photon angular resolution is essential to discrimate clusters at high energies
Both θ and ϕ have $\sigma \sim 0.05^\circ < 1$ mrad

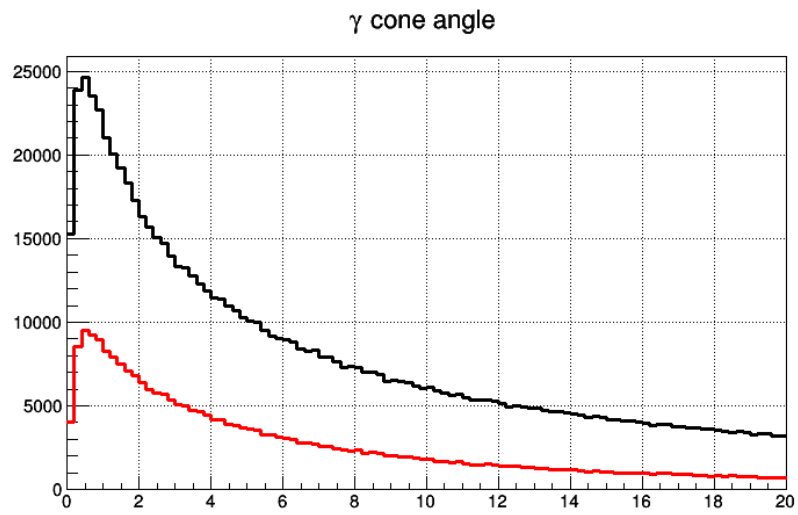


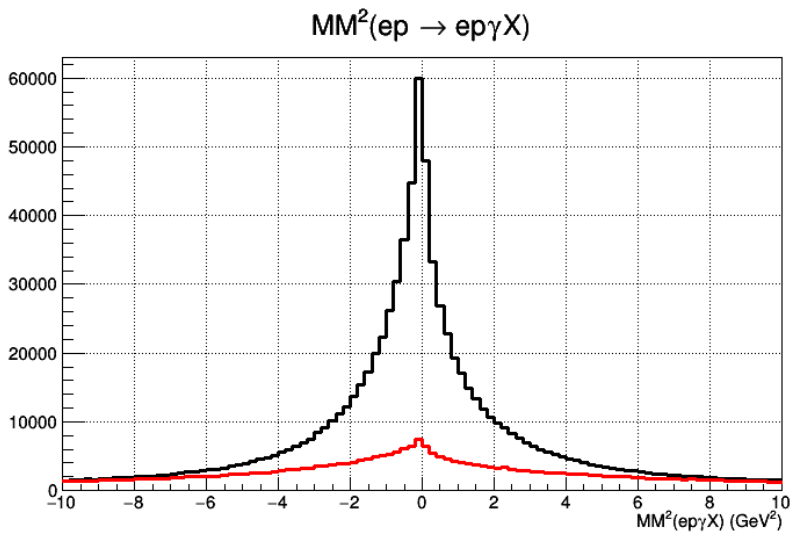
Corresponding invariant mass resolution $\sim$ 5 to 20 MeV

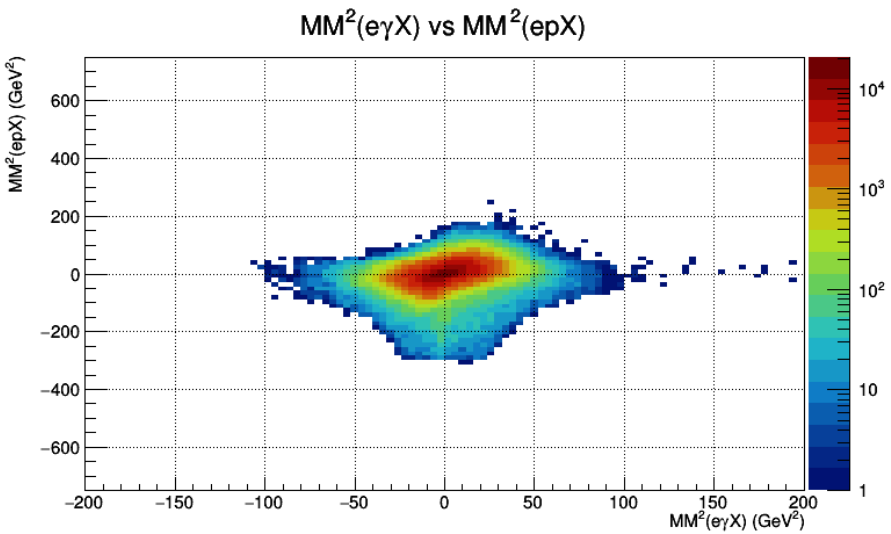


DVCS π^0 separation 5 GeV $\times$ 40 GeV



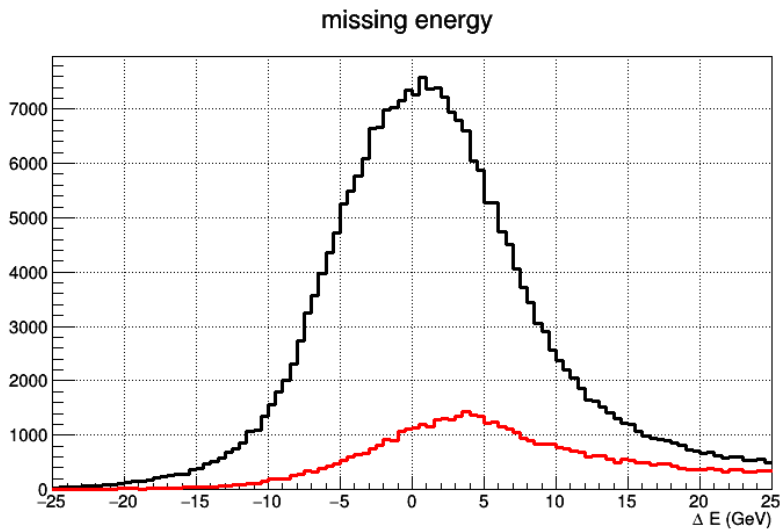


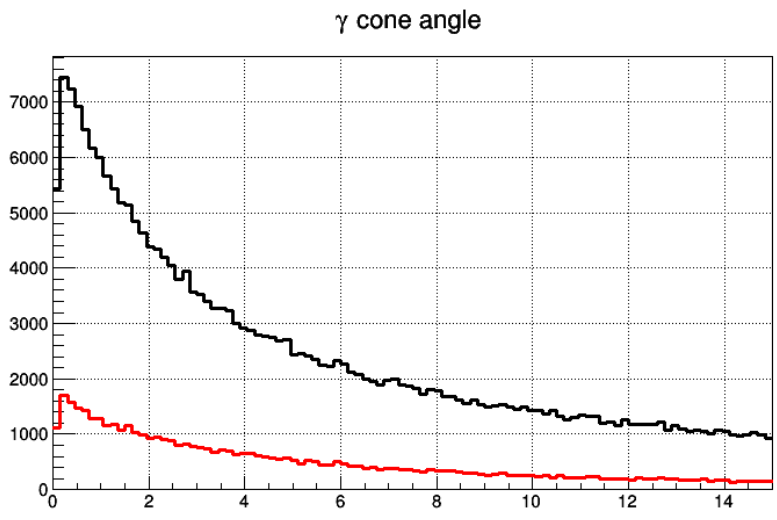


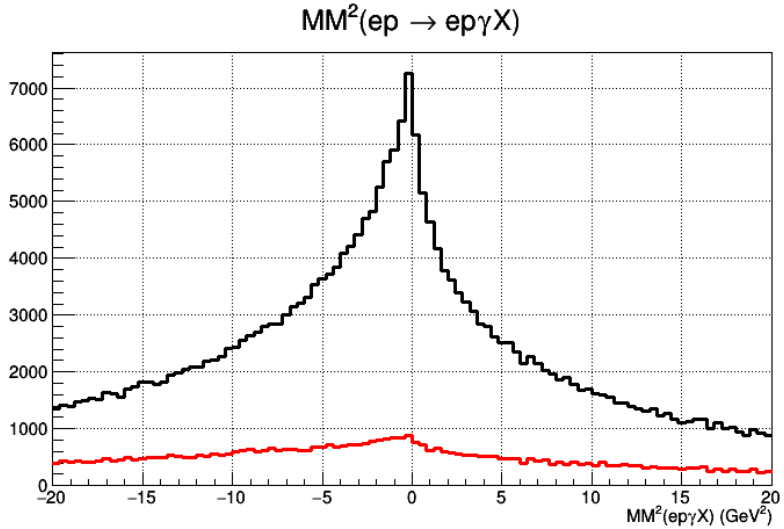


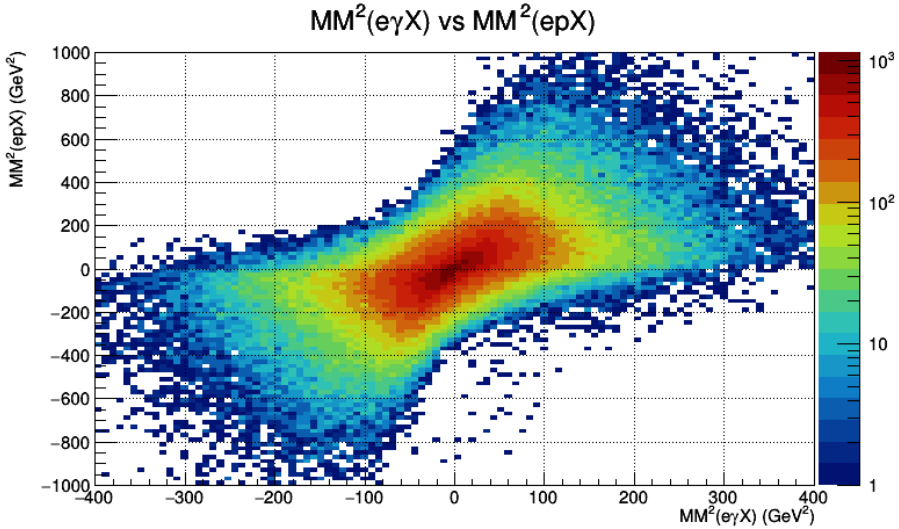
Good separation at low energy

DVCS π^0 separation 10 GeV $\times$ 100 GeV



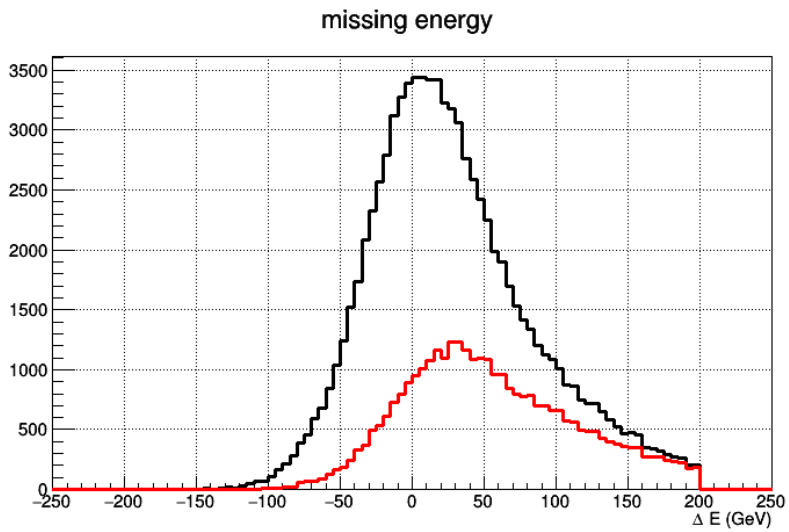


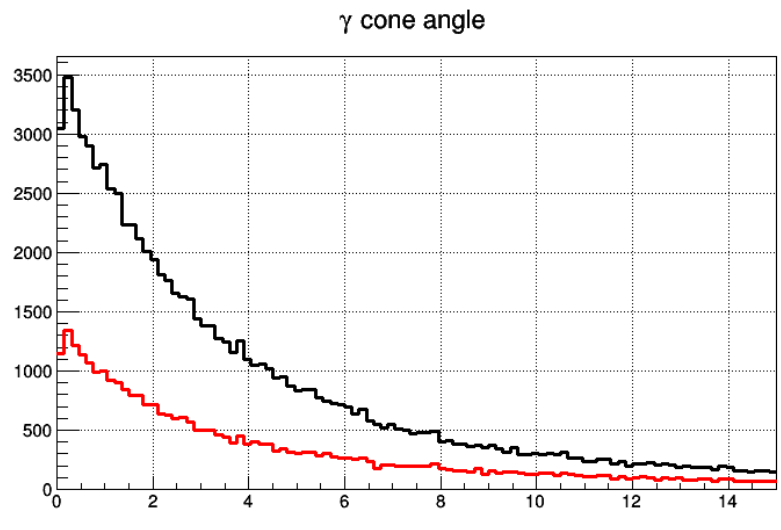


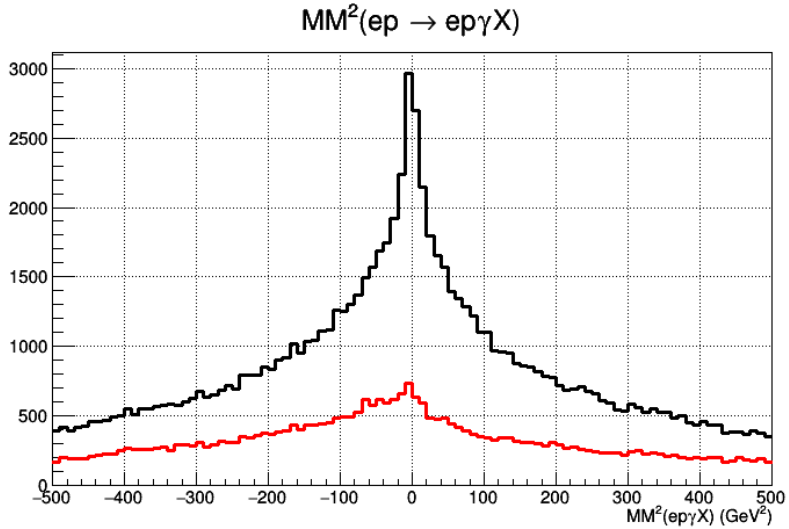


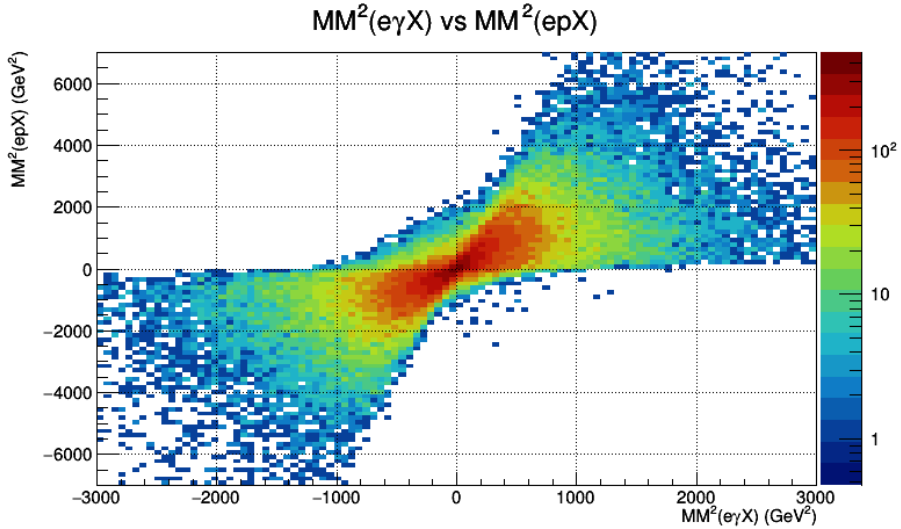
Good separation at medium energy

DVCS π^0 separation 18 GeV $\times$ 275 GeV









Challenging background at high energy

Summary

- Scenarios 18 GeV $\times$ 275 GeV, 10 GeV $\times$ 100 GeV and 5 GeV $\times$ 40 GeV
- First look at DVCS π^0 separation
- Absolute normalization of π^0 to DVCS: need HERA data

- **Photon angular resolution** is crucial
- First results only, lots of possible improvements
- Other backgrounds also (?)