Update: ep DVCS

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Why do this?

- Physics case
  - DVCS on ep is low-hanging fruit for ePIC, but it still needs to be done.

- Detector verification
  - Good channel to look at resolution of B0 spectrometer.
 - Tests reconstruction algorithms in Roman Pots.

Current work

- Using outputs of ePIC simulation campaigns to keep a running eye on B0 behaviour.
  - eg. `/eictest/EPIC/RECO/23.10.0/epic-craterlake/EXCLUSIVE/DVCS_ABCONV/10x100`
- Only looking at 10x100 so far, to compare with previous B0 resolution studies.

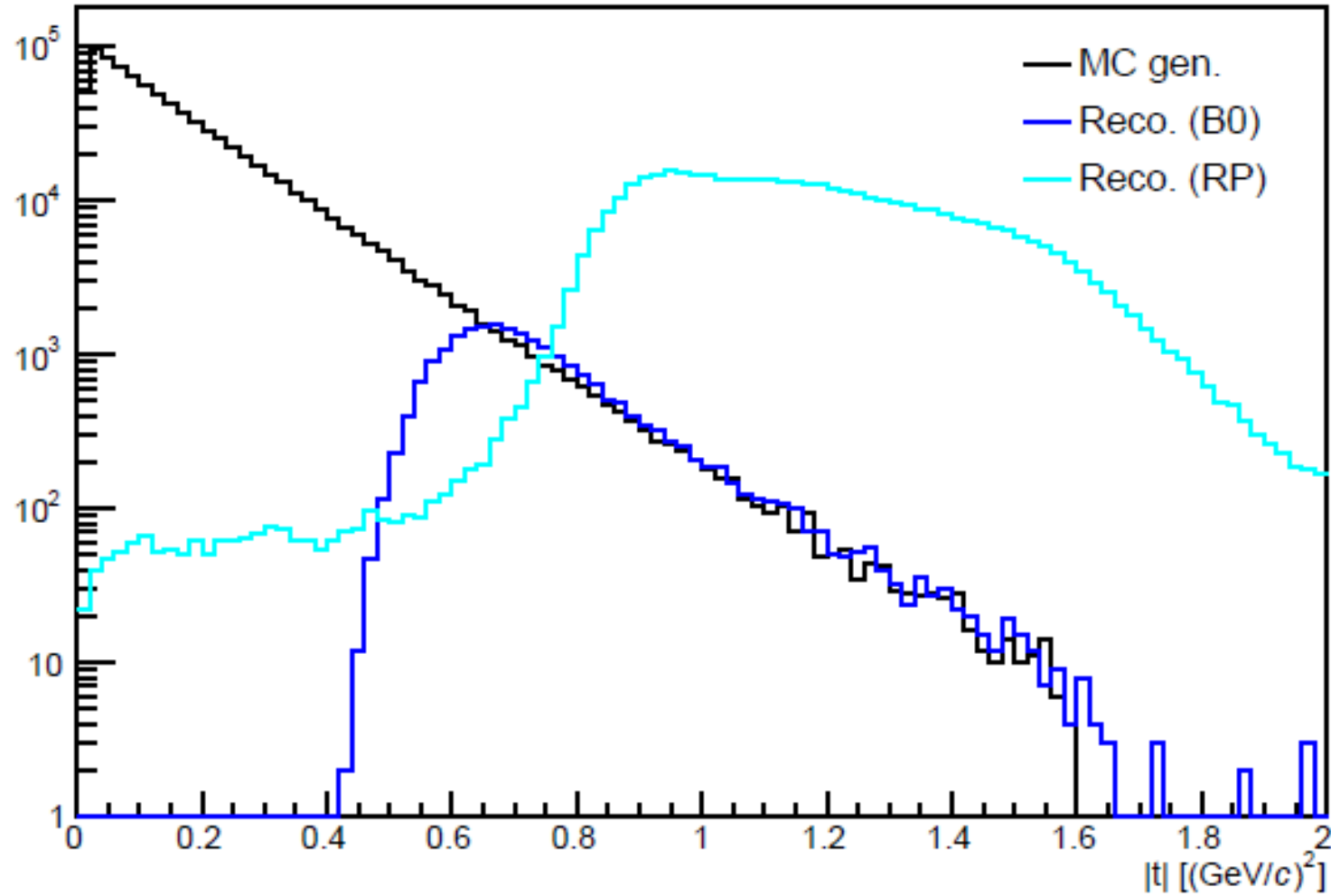- Following plots are from October '23 campaign.
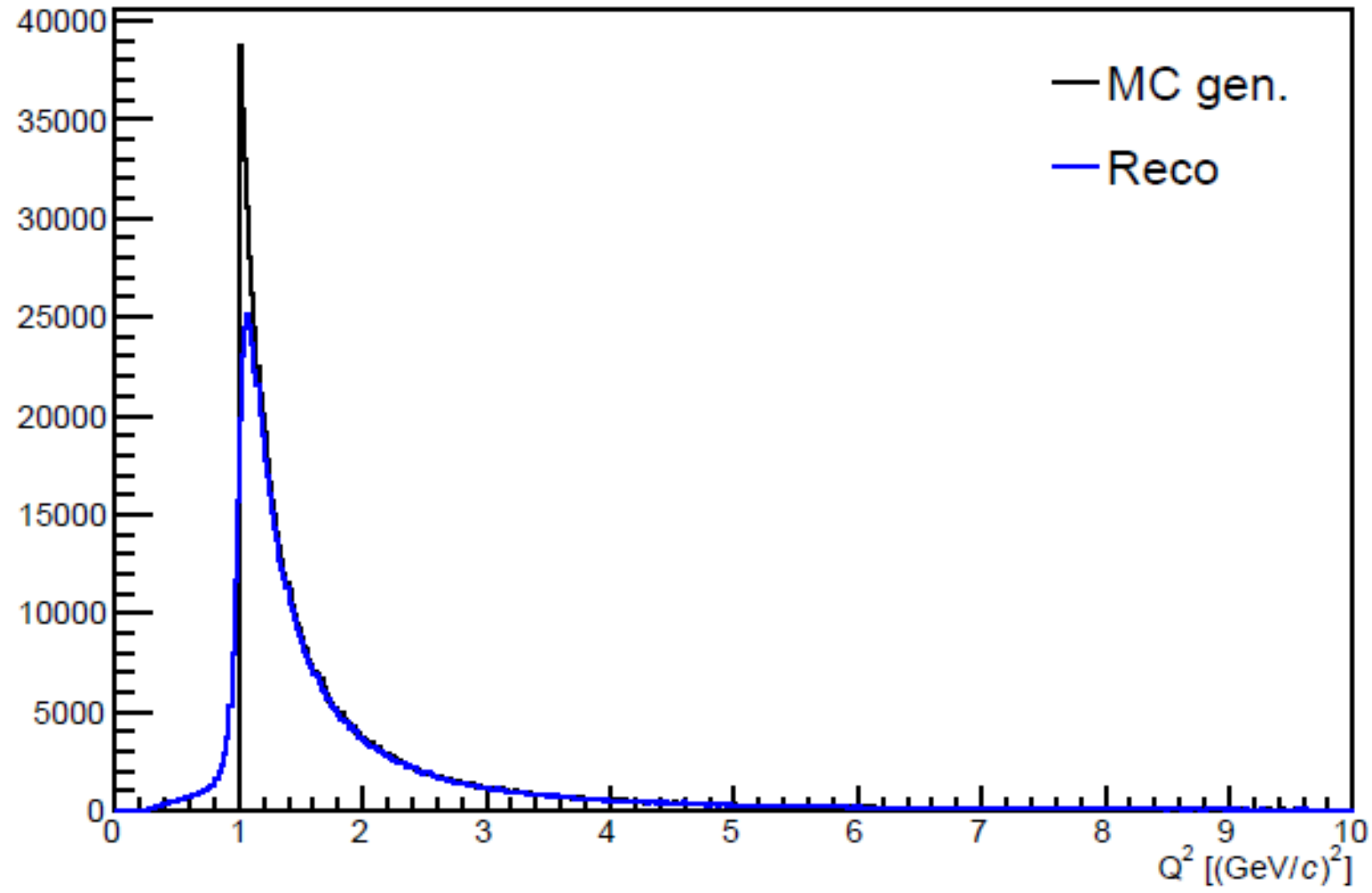
Detector coverage (MC thrown)
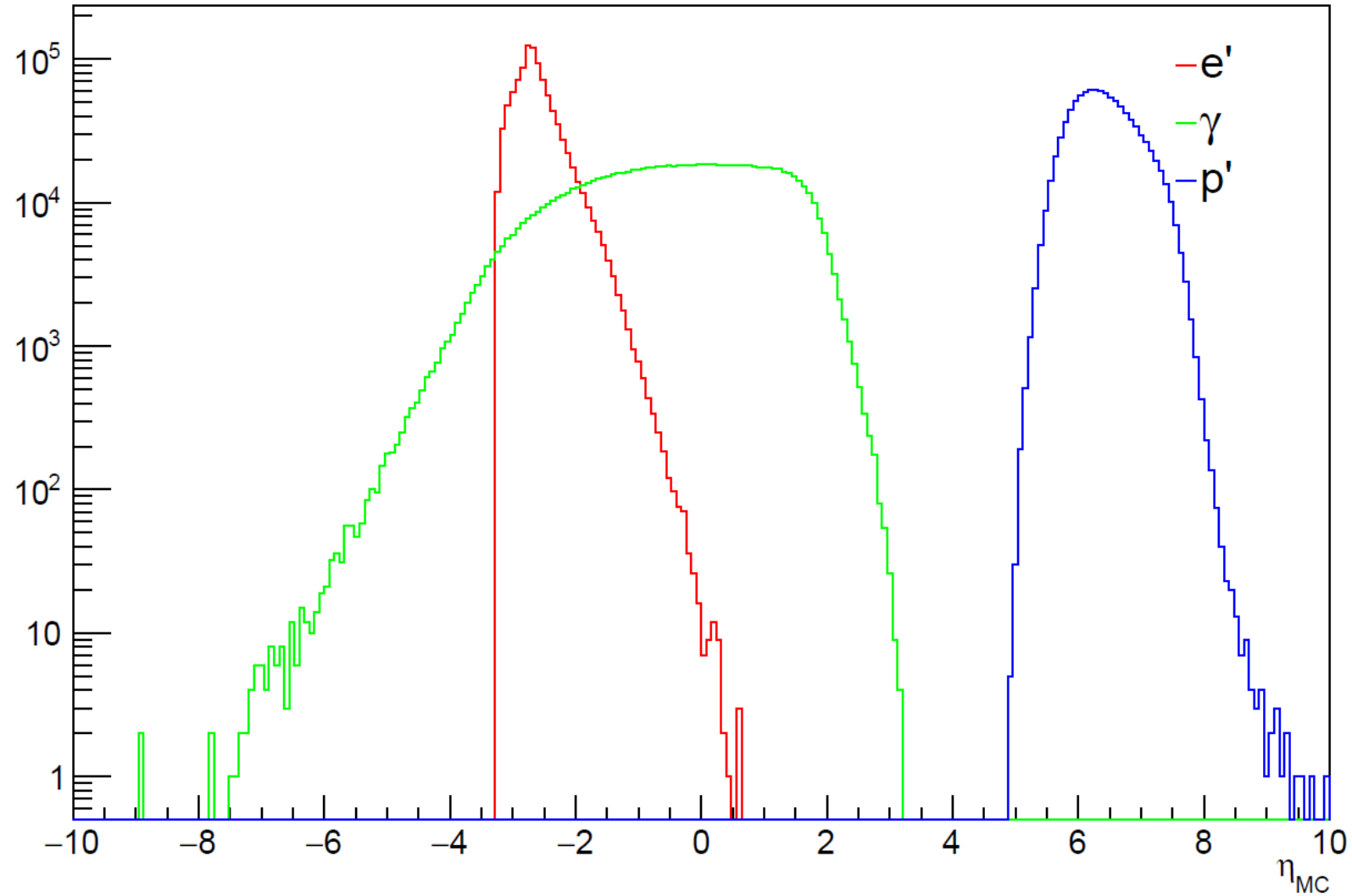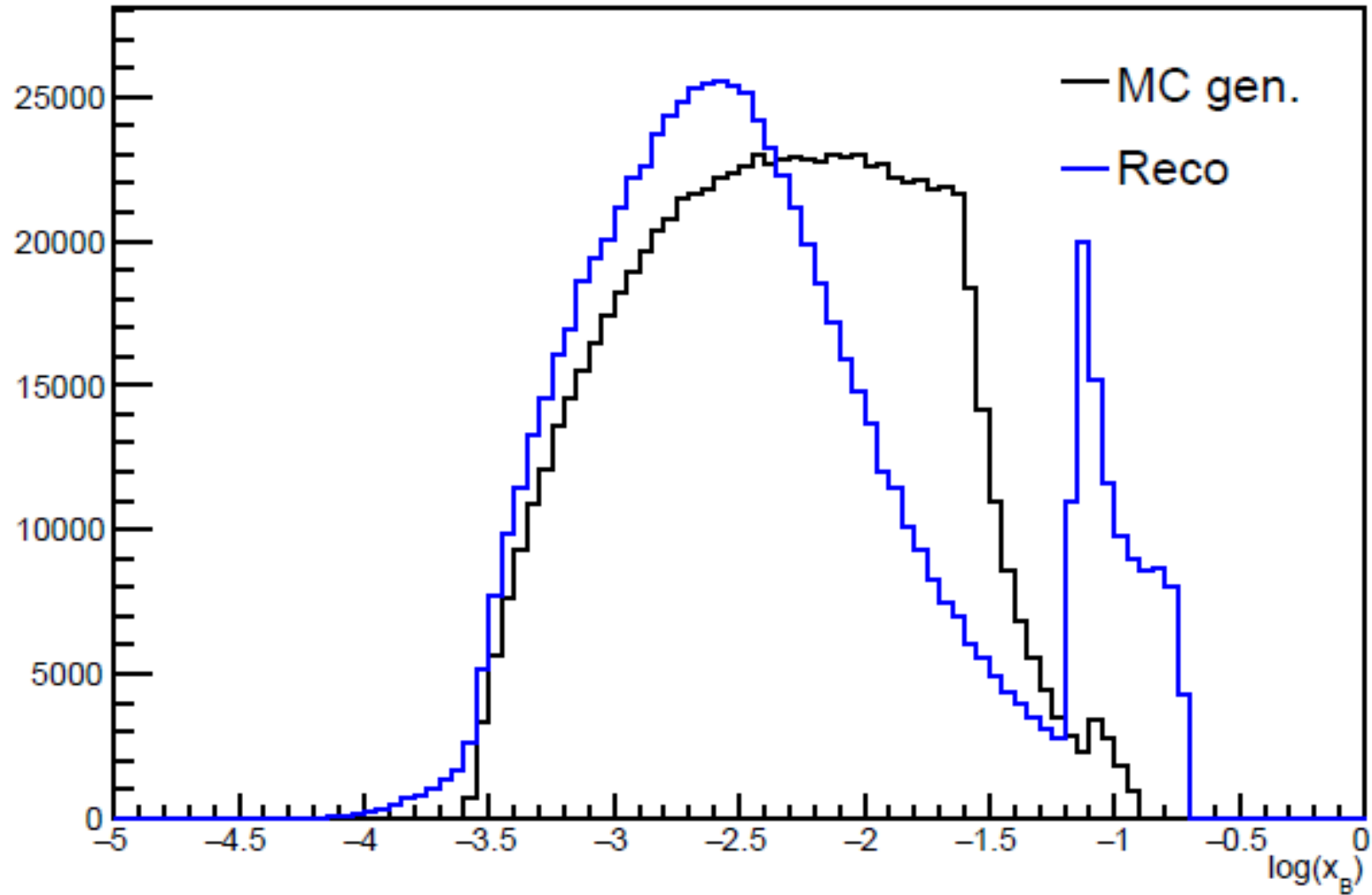
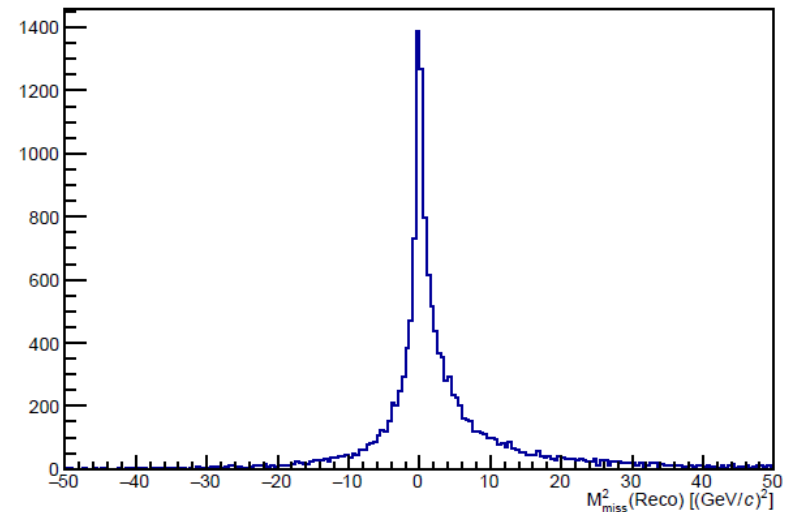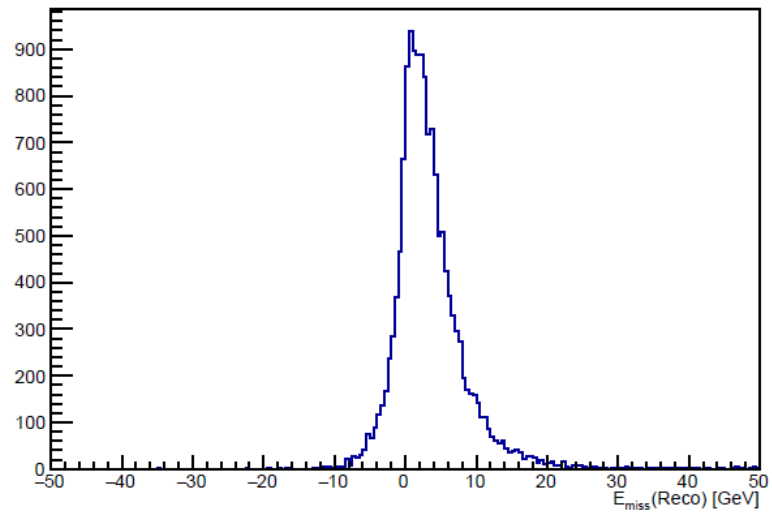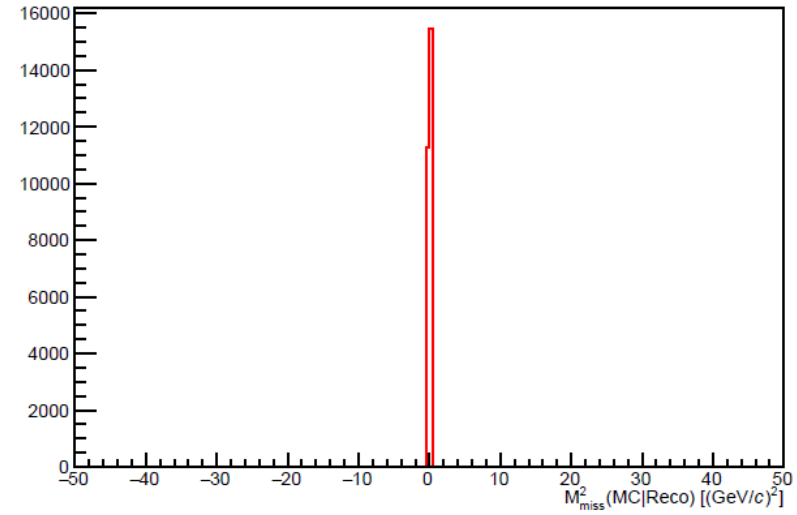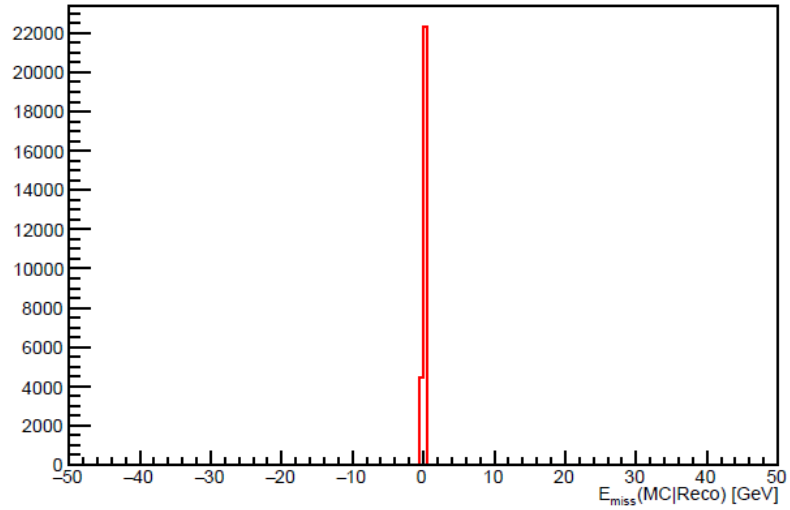# Detector coverage (reconstructed)
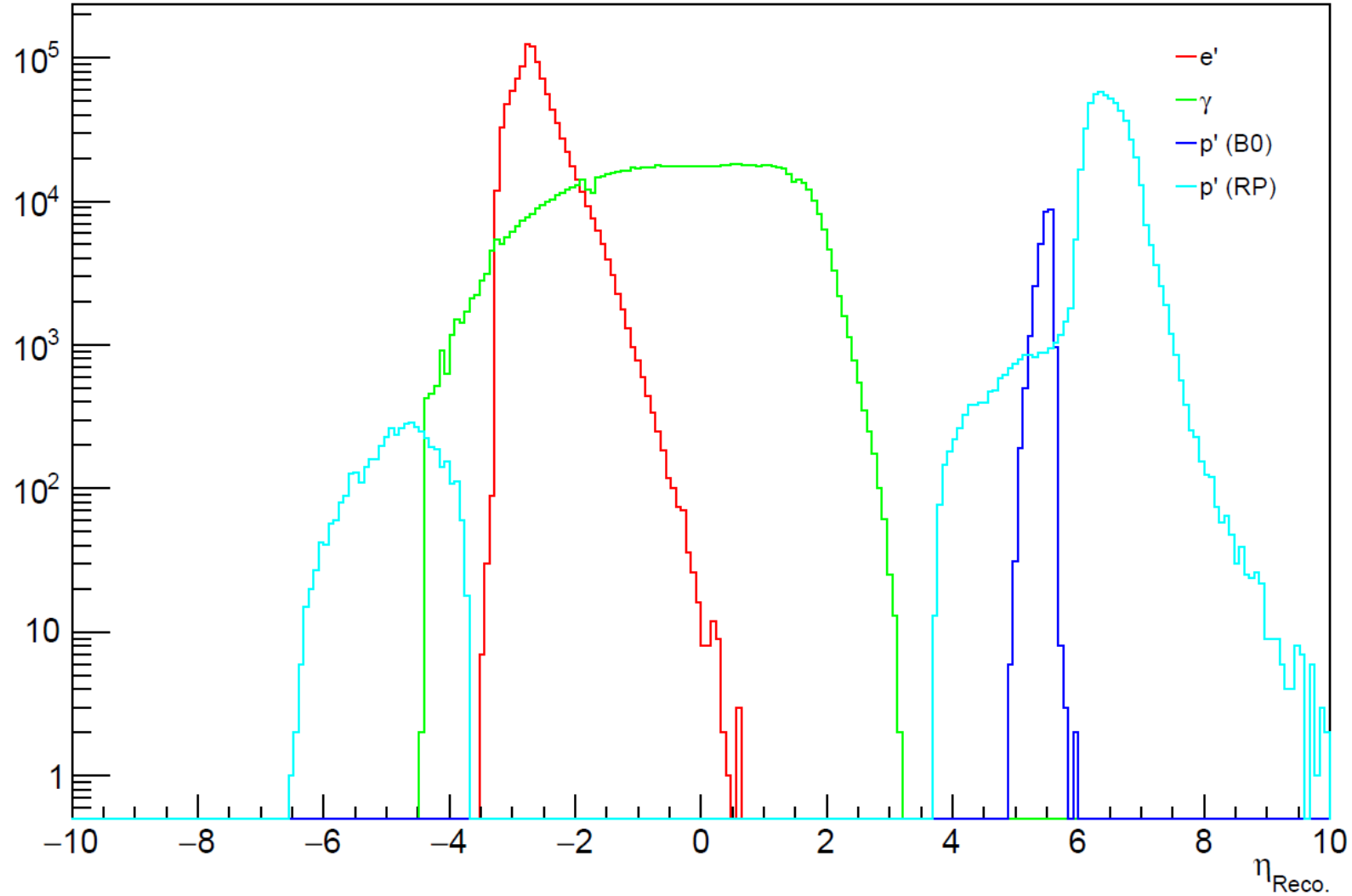
Kinematic variables - t

Kinematic variables – Q^2

Kinematic variables - x_B

Missing mass/energy

Recoil electron kinematics
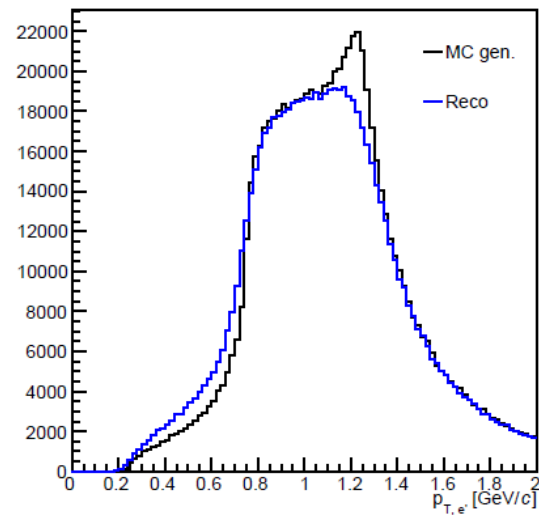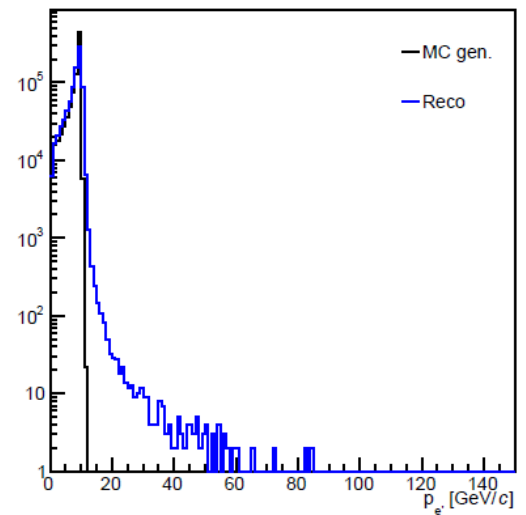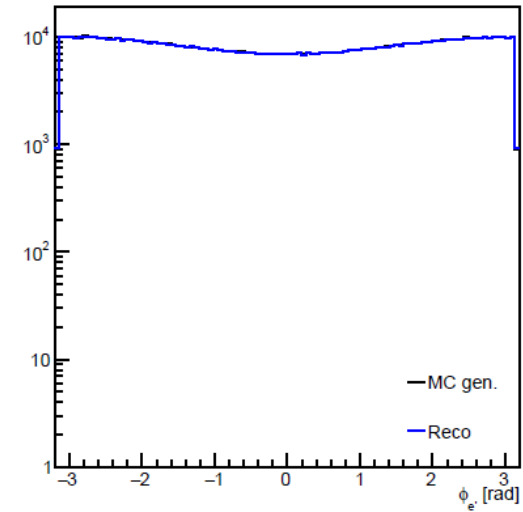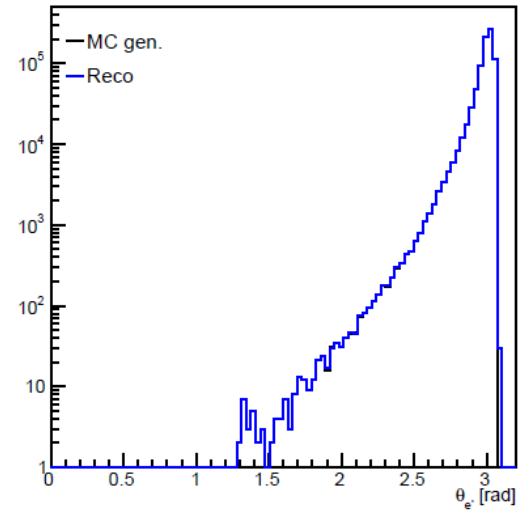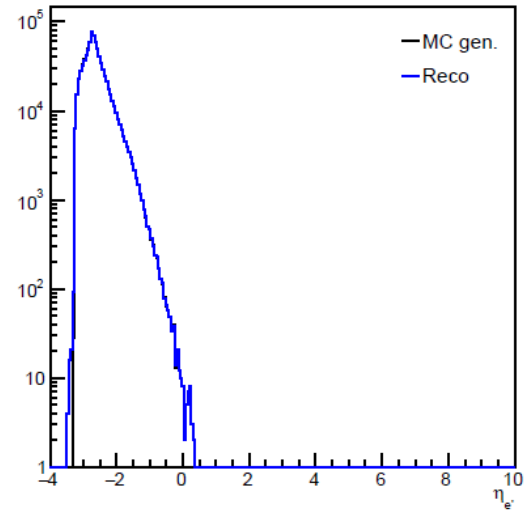
Recoil proton kinematics
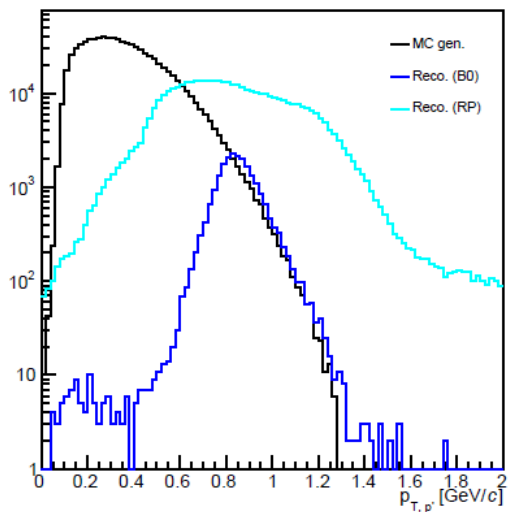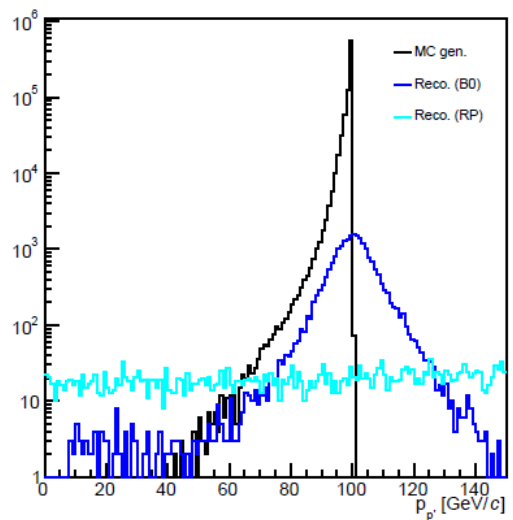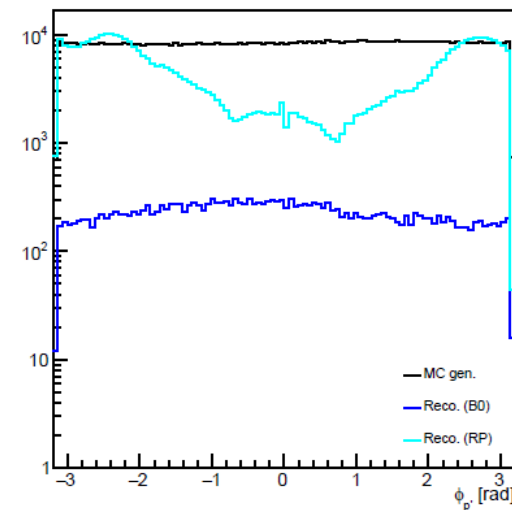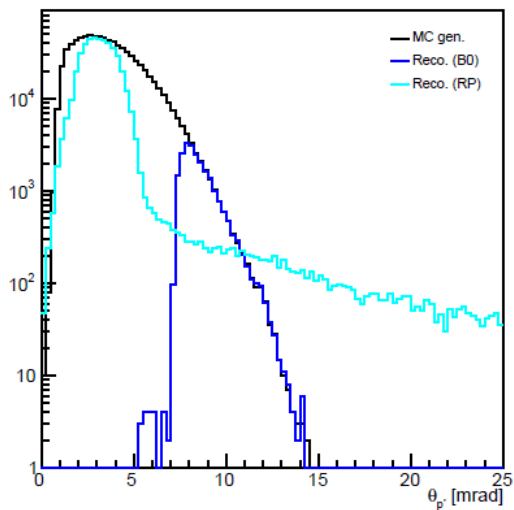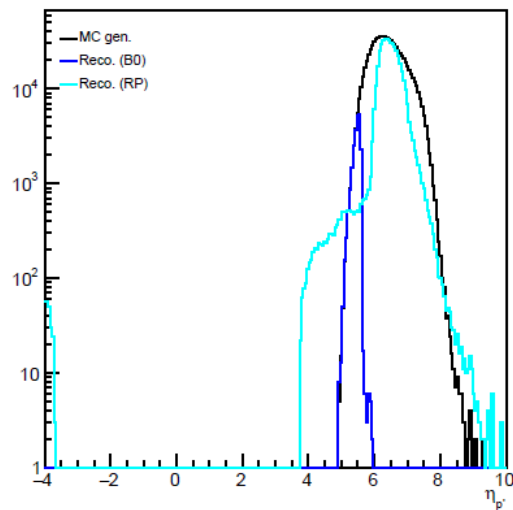
B0 occupancies
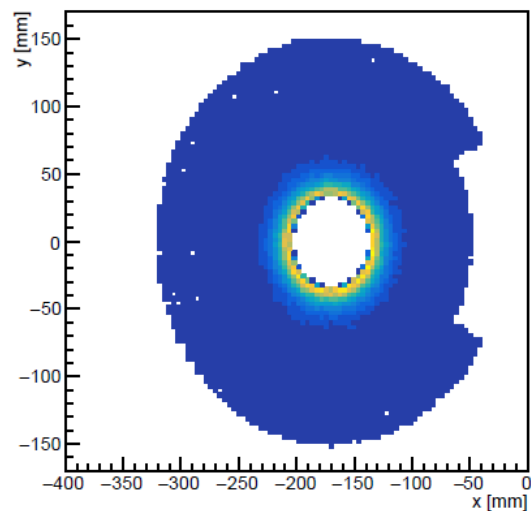
B0 momentum resolution ($p_{p'} = [80, 100]$ GeV/c)

b0_extracted_p_resolution

B0 p_T resolution ($p_{p'} = [80, 100]$ GeV/c)

b0_extracted_pt_resolution

Roman Pots occupancy
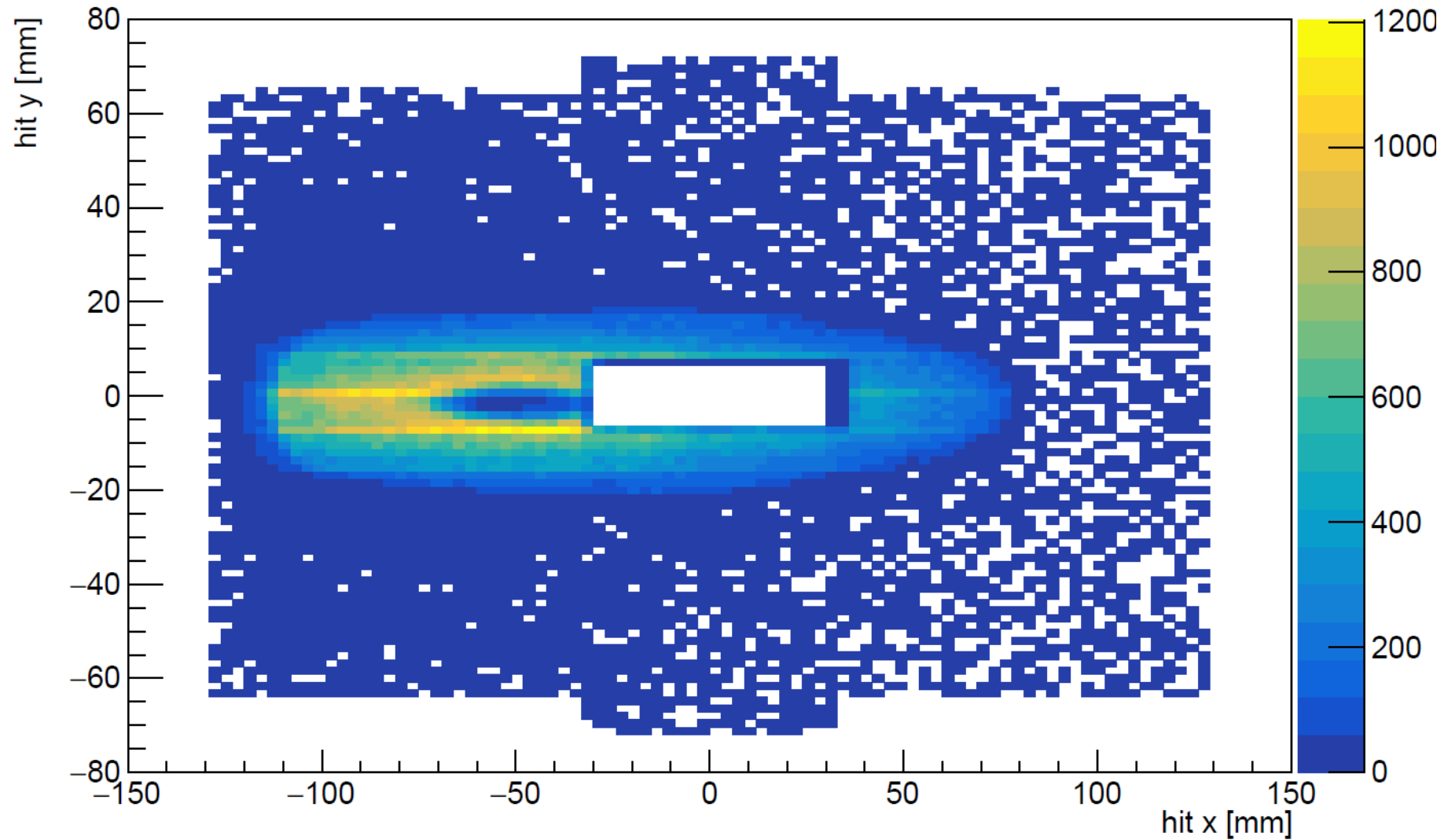
Thoughts

- For the most part, particle reconstruction is good in the barrel and B0.
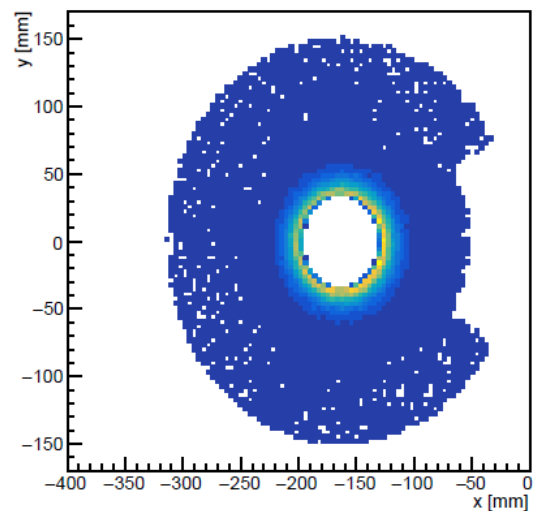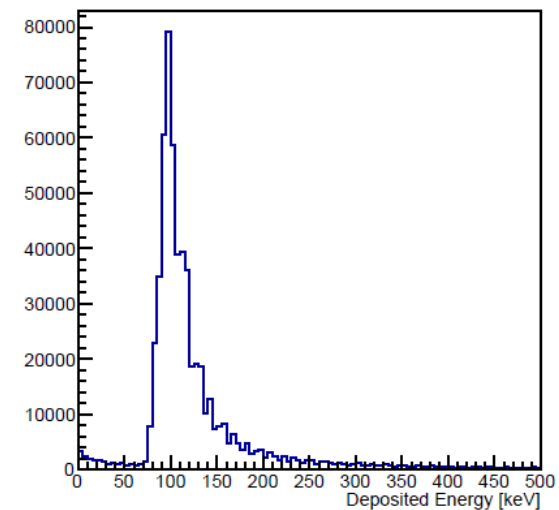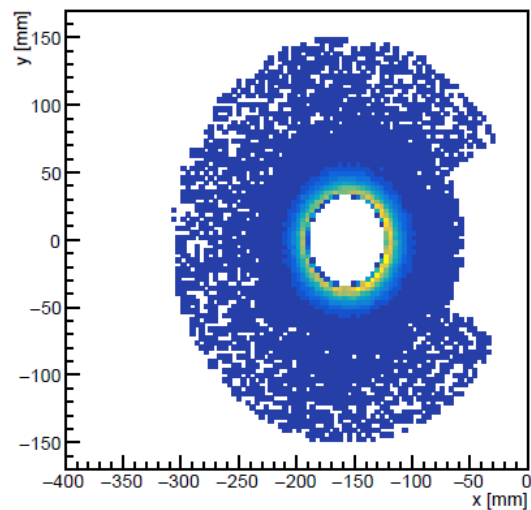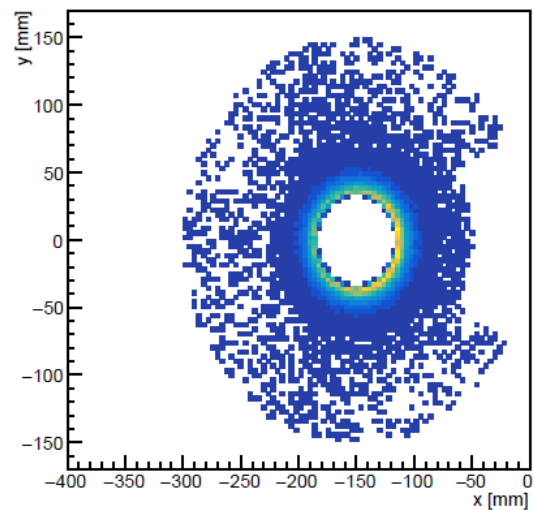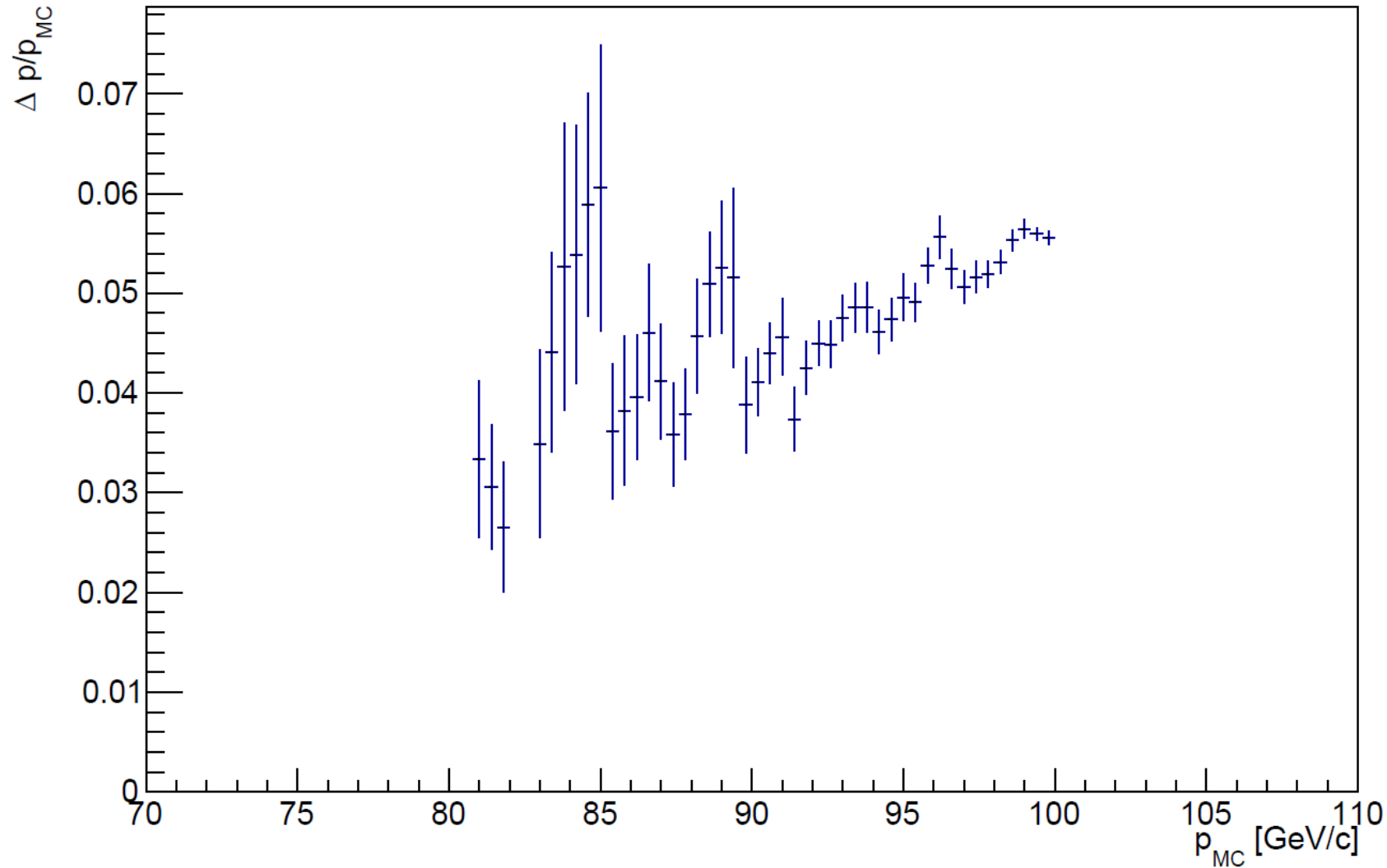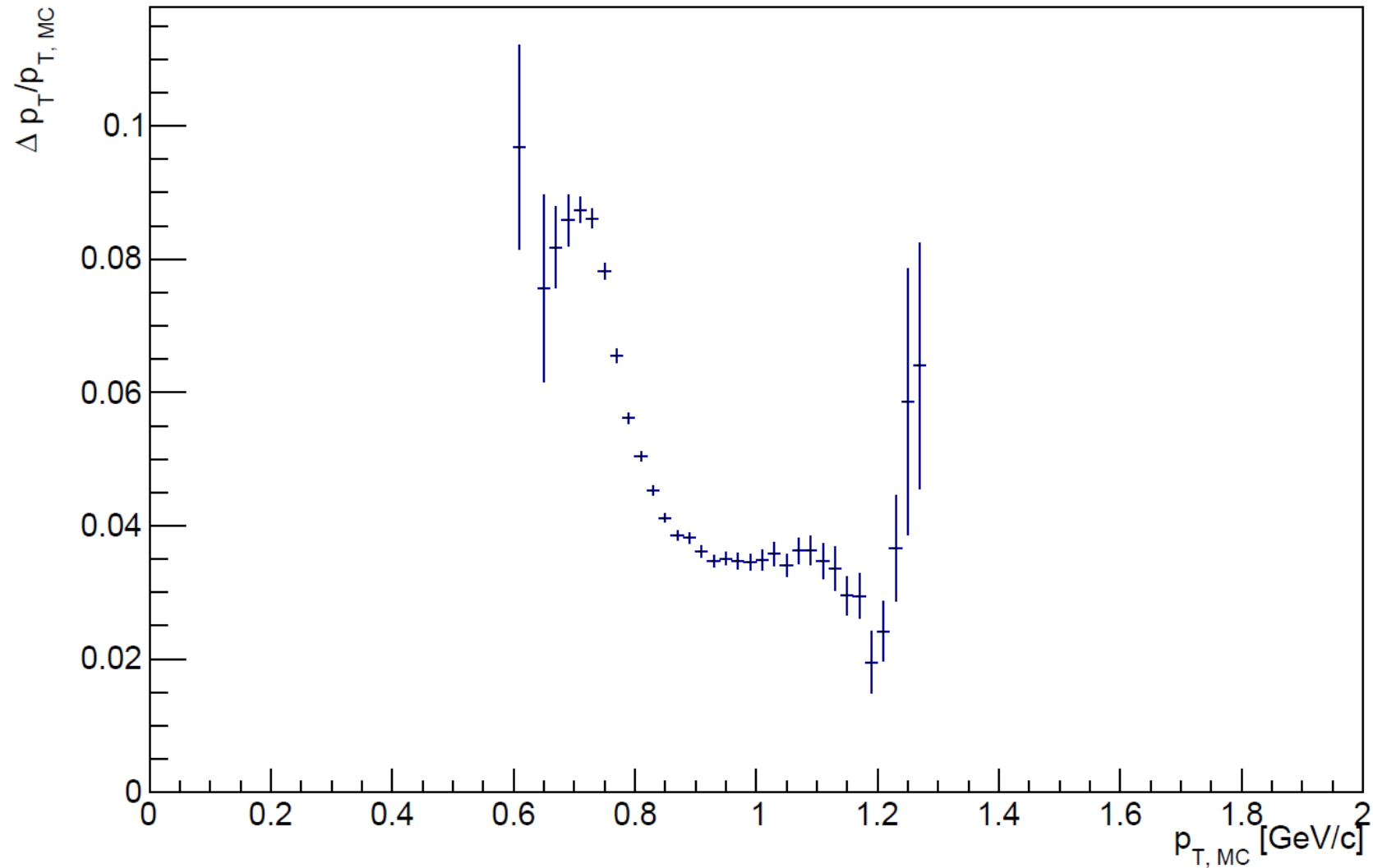 - There are severe smearing effects in the reconstructed protons, which are already limited heavily by acceptance.
- Issues (not unknown) lie in the RP reconstruction found in the campaigns.
- The B0 momentum resolution looks as expected.
  - Just shy of 10% uncertainty for low p_T, improves to 4% at p_T around 1 GeV/c.
  - 3-momentum uncertainty increases as a function of p, but only by a few percent.

To do

- Finalise smaller list of plots.

- Turn these plotting macros into a running benchmark.

- Get DVCS back in the monthly campaigns (wasn't in December's).

- Need to check if restricting momentum of reconstructed particles affects missing E/M^2.

- (If time allows) Rerun eicrecon with modified RP matrix.