

Geant 4.10.02p2 vs 4.10.03.p3

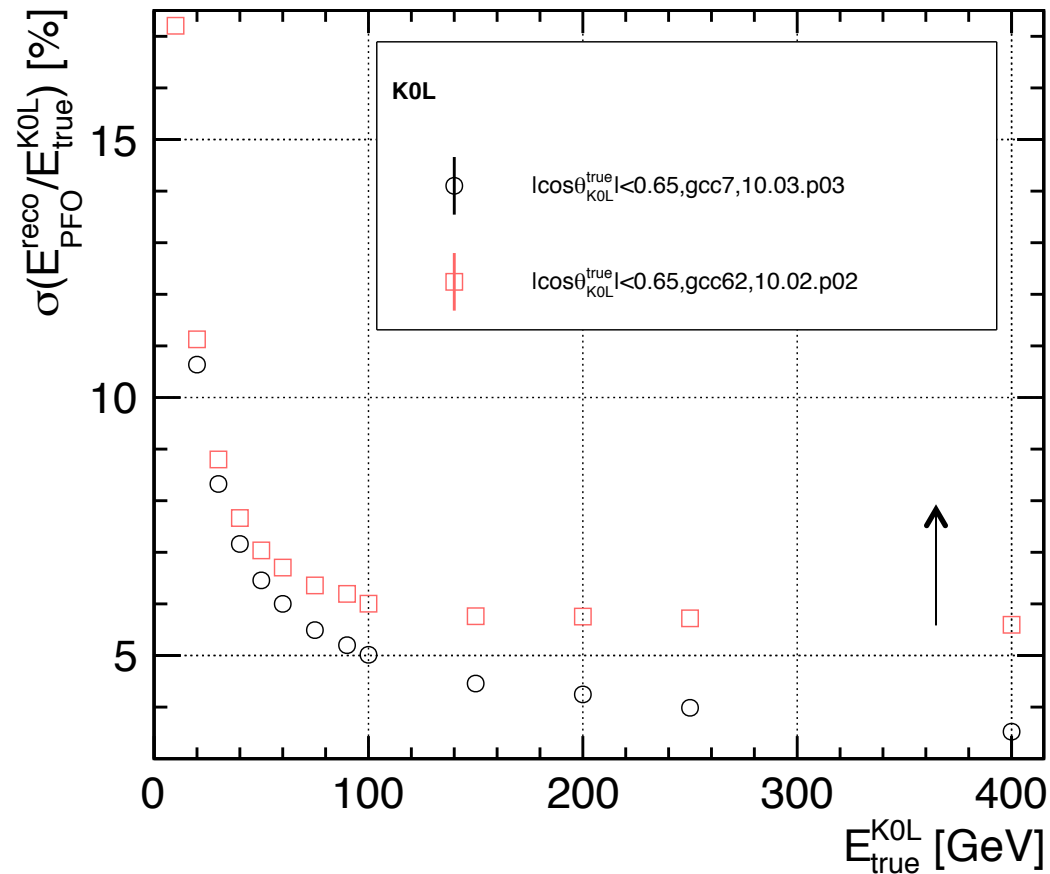
Neutral Hadrons and Jets

Matthias Weber (CERN)

Big differences on HCAL shower observed



Recalibrate: HCAL Hit Energies, PandoraPFA Hadron constants, as well as Software Compensation weights → quite sizable differences in Hadron Energy resolutions

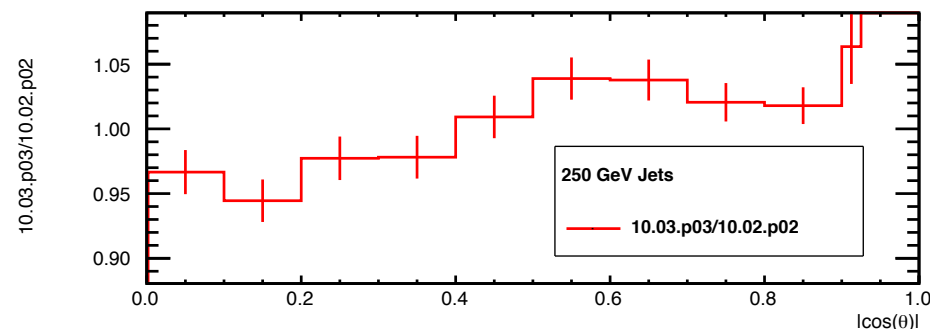
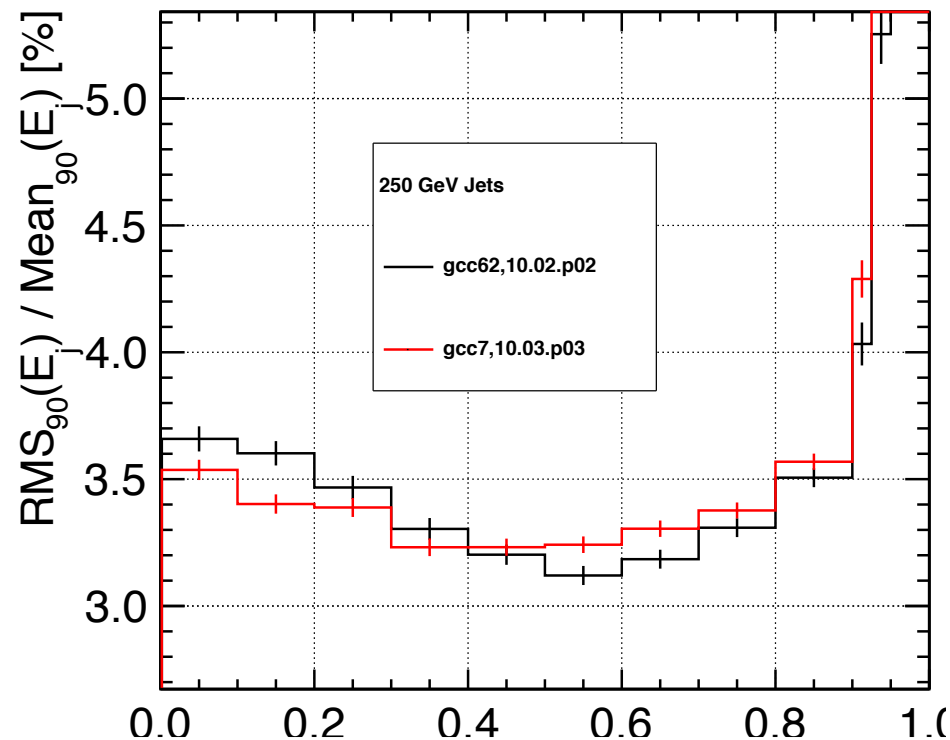
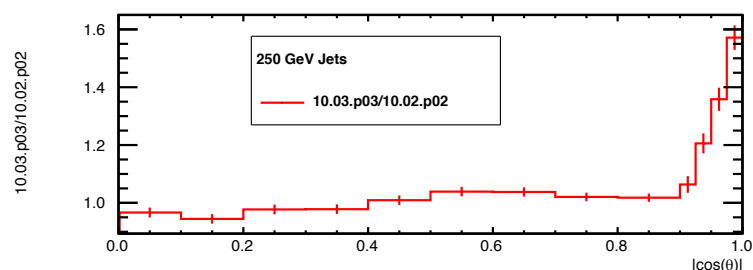
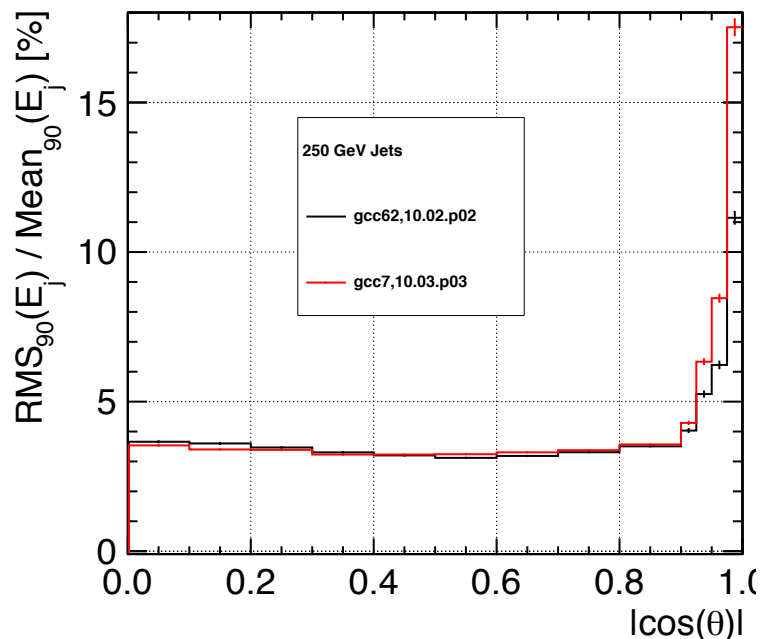


→ Resolution lower for large KL0 energies

Differences on jet level: 250 GeV jets

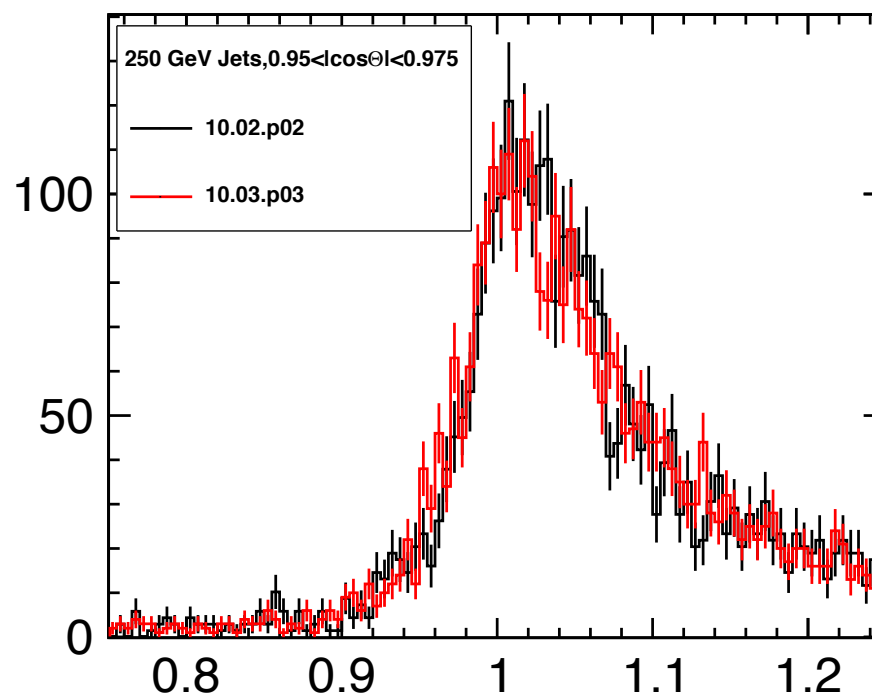
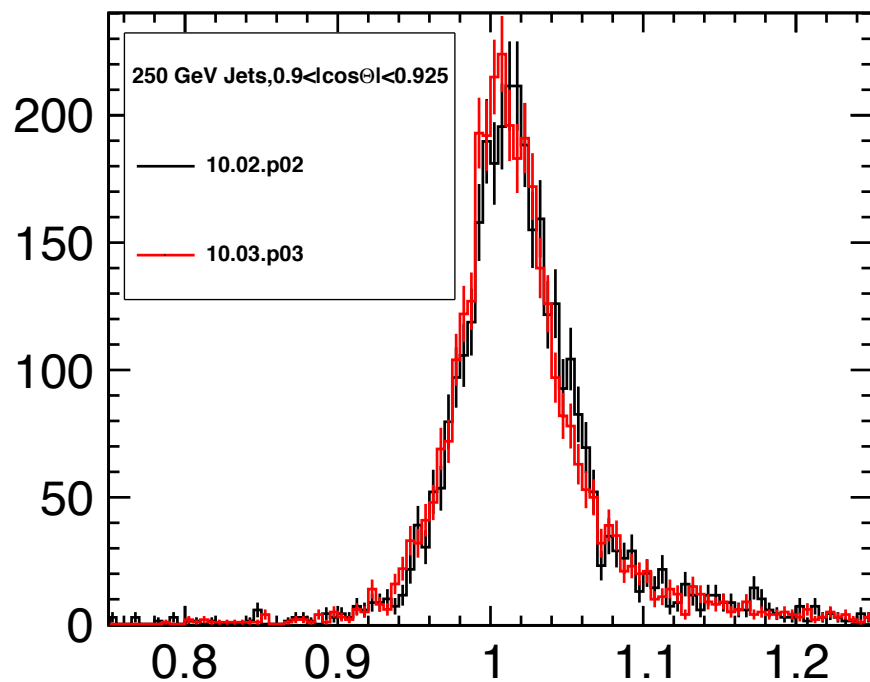


Use $Z \rightarrow uds$ sample at 500 GeV



➔ Values differ by around 3 %, a lot worse in forward region
➔ Same behavior for 1.5 TeV and 3 TeV samples

Huge issue for forward jets?

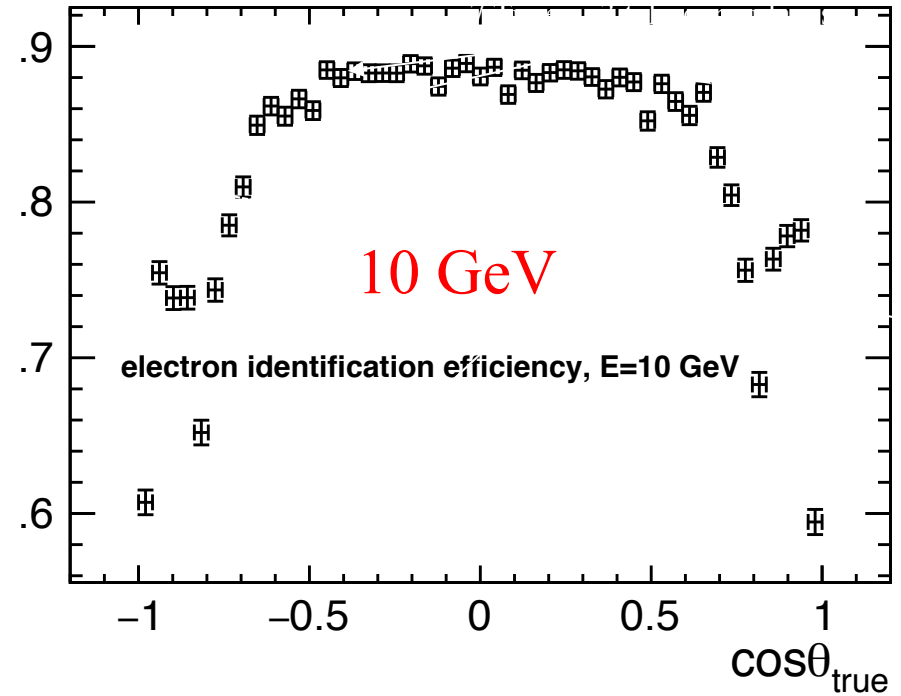
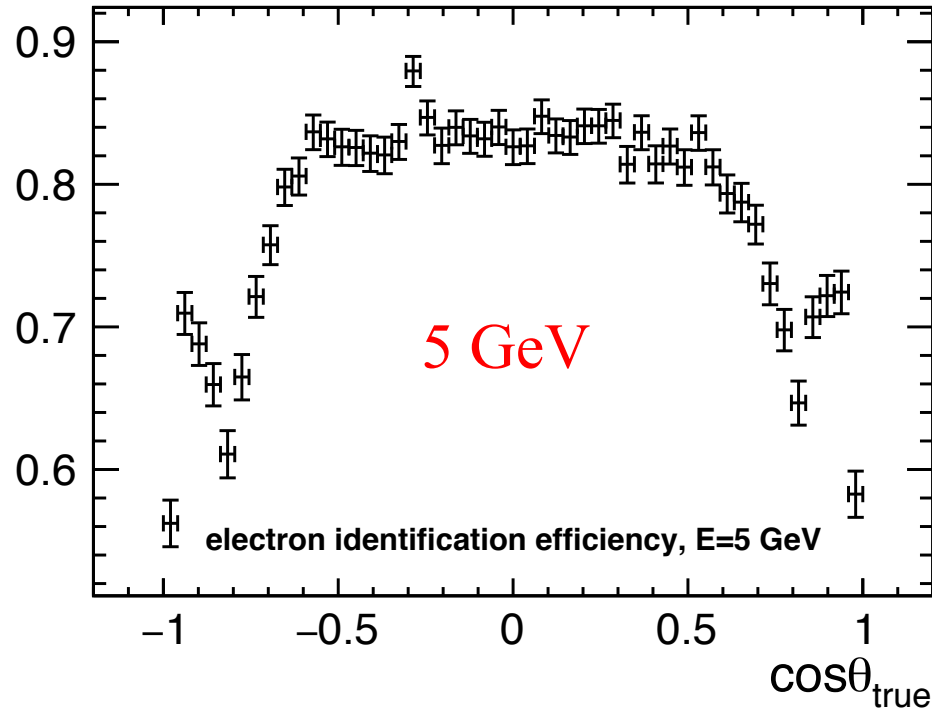


Not that huge difference, maybe artifact of RMS90, since statistics for 10.02p02 about 30 % less events than for 10.03p03

Electron ID efficiency



Match between true and reconstructed electron within 0.5 degrees

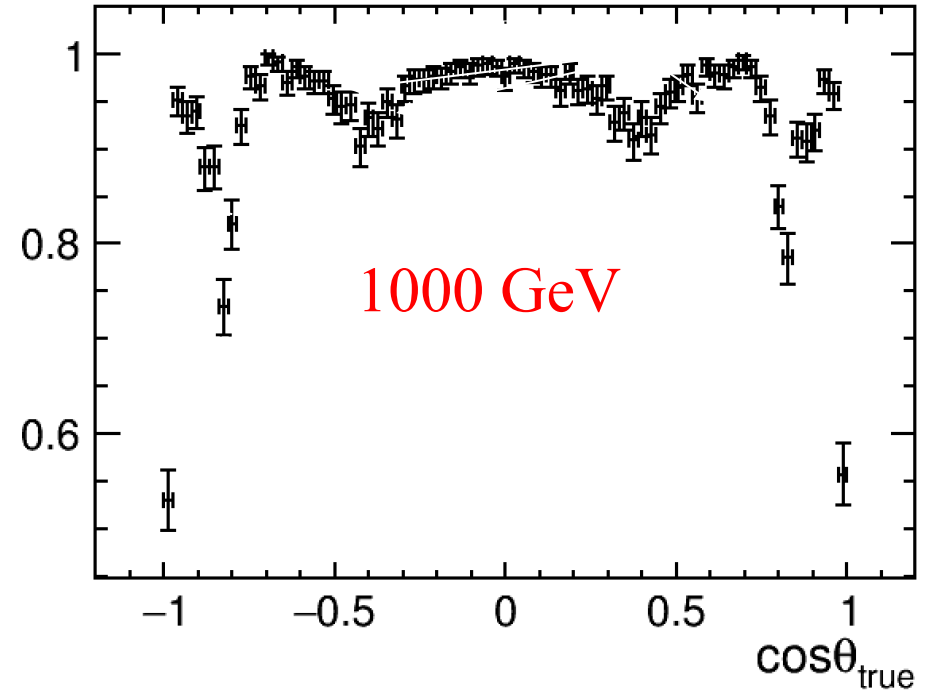
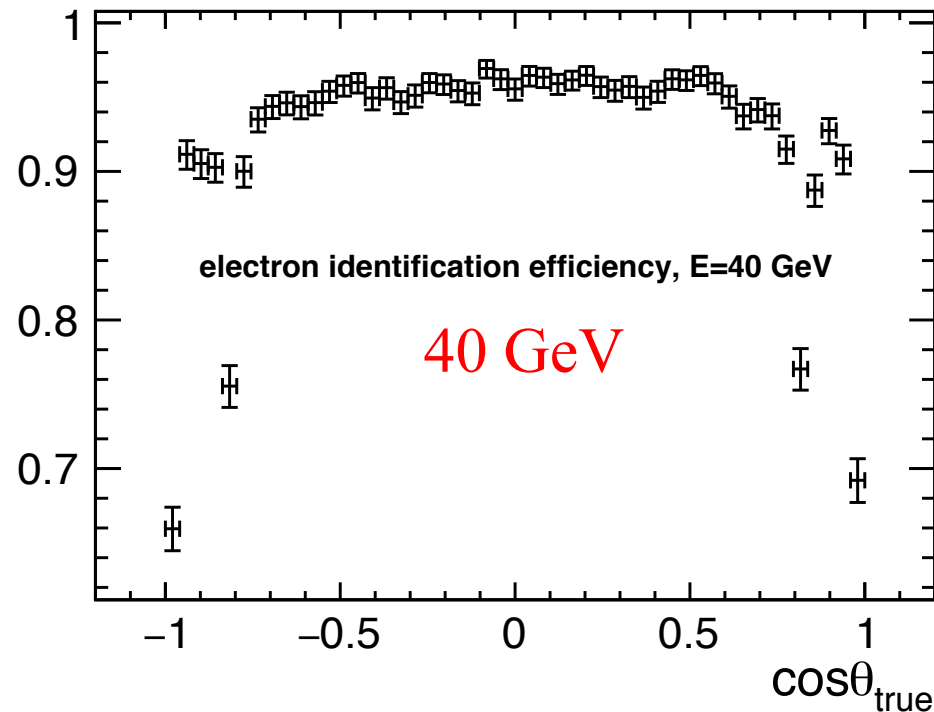


At 5 GeV around 80 % in barrel, in endcap only at 70 %, increases to 90 % (75%) at 10 GeV

Electron ID efficiency



Match between true and reconstructed electron within 0.5 degrees

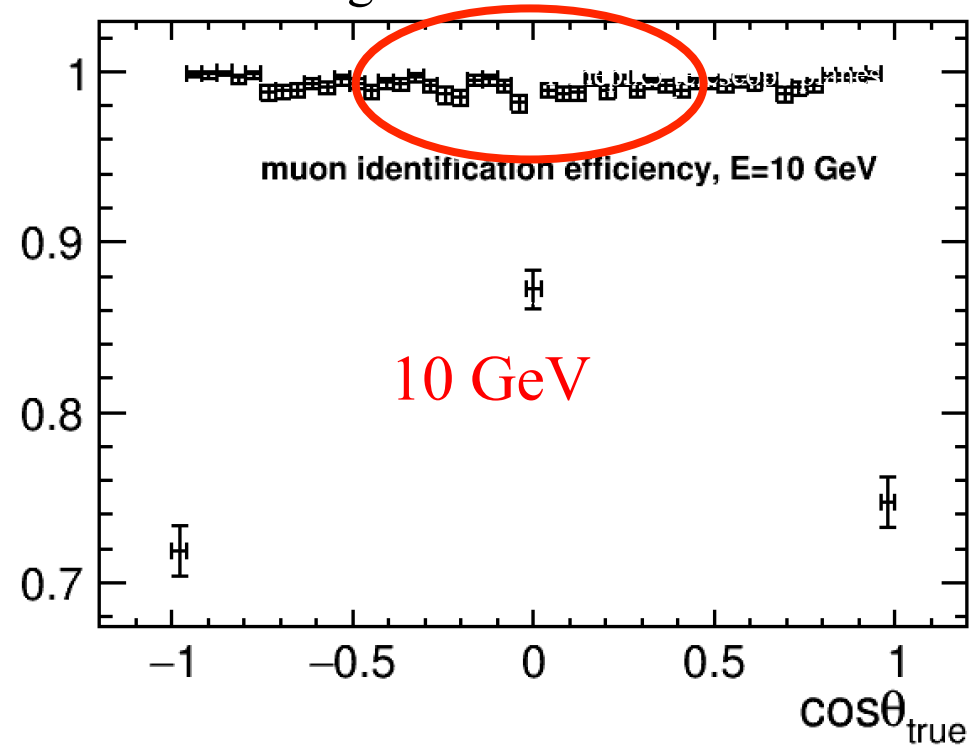
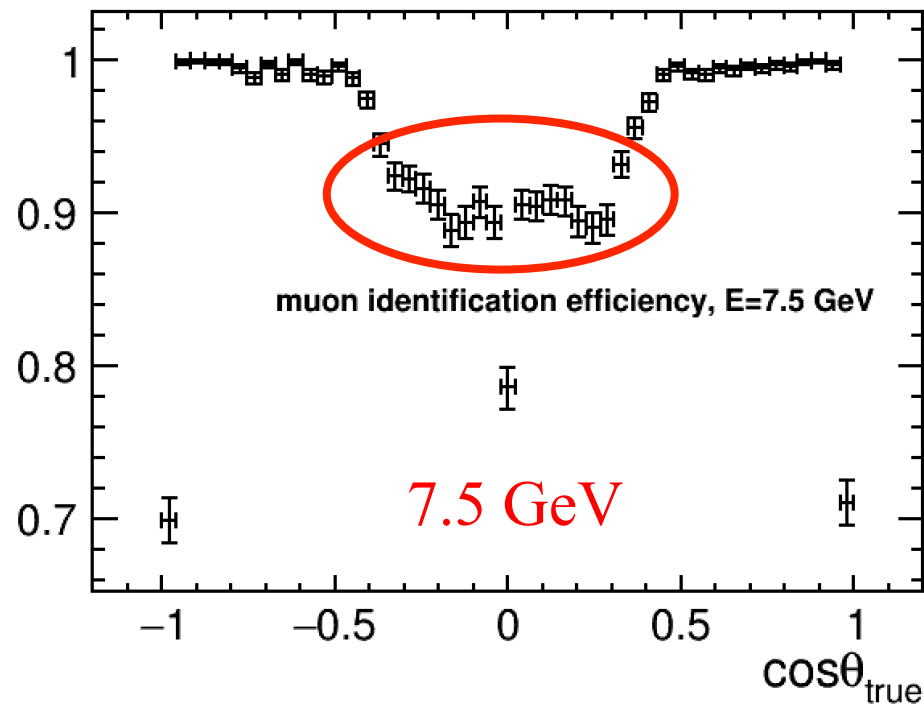


At 40 GeV reach plateau of around 95 % in barrel, in endcap only at 93 %, start observing a slight drop off for very high energetic electrons around theta 90 degrees (not observed for 500 GeV)

Muon ID efficiency: low energies



Match between true and reconstructed muon within 0.5 degrees

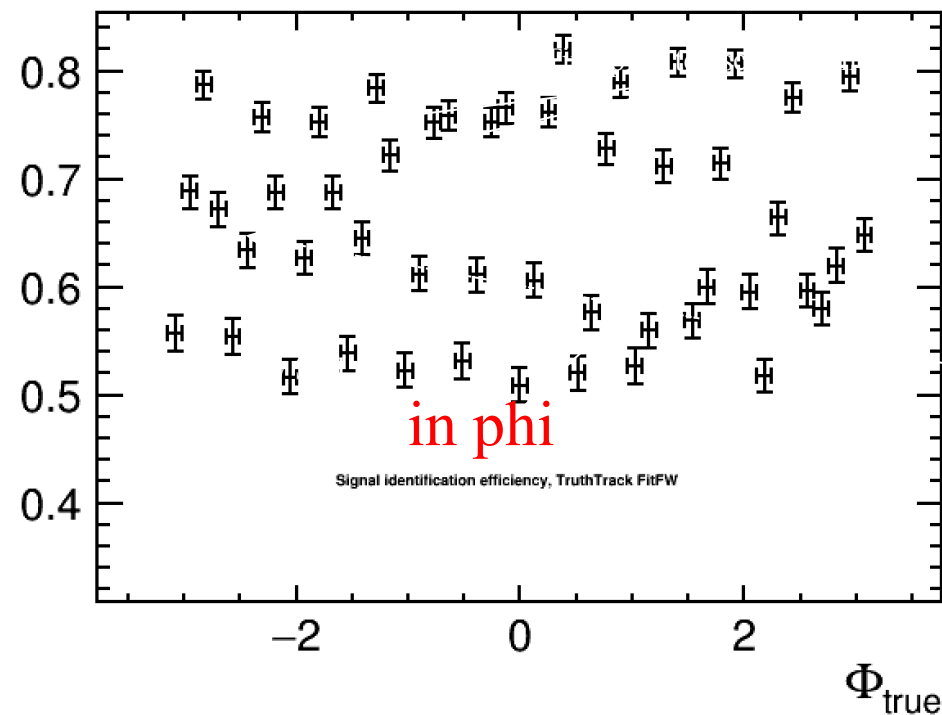
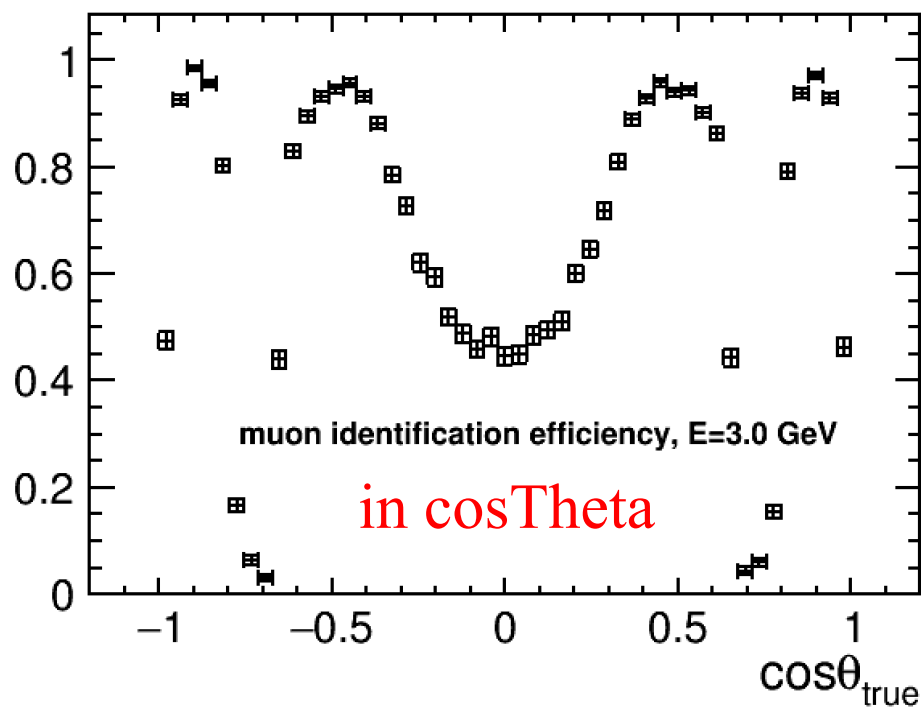


In central barrel efficiency around theta of 90 degrees bad, at endcap efficiency over 97 % → at 2 GeV also no muons reconstructed for endcap, at 3 GeV drop of efficiency in barrel

Muon ID efficiency: 3 GeV muons



Match between true and reconstructed muon within 0.5 degrees

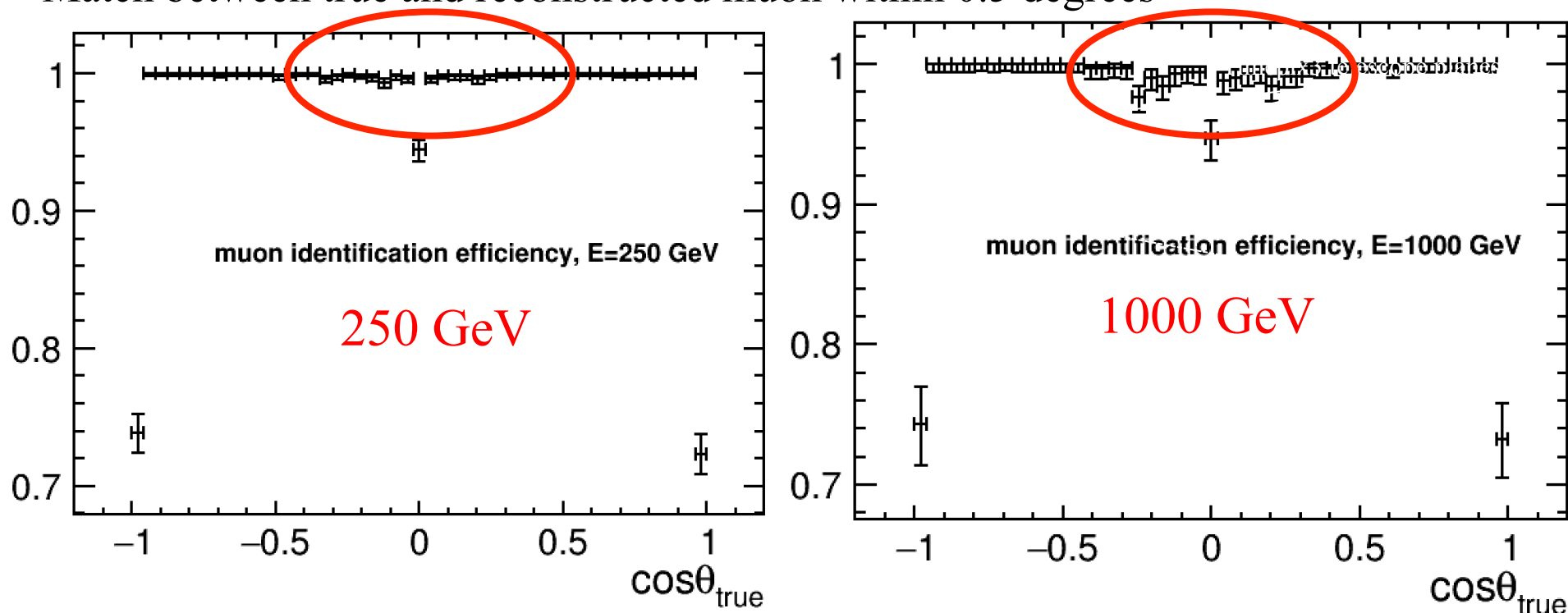


In innermost barrel drops down to 40 %, some muon tracks don't reach muon chambers, structure observed vs phi at that low energies

Muon ID efficiency: high energies



Match between true and reconstructed muon within 0.5 degrees



In innermost barrel efficiency drop to below 98 %