Performance of Lepton ID

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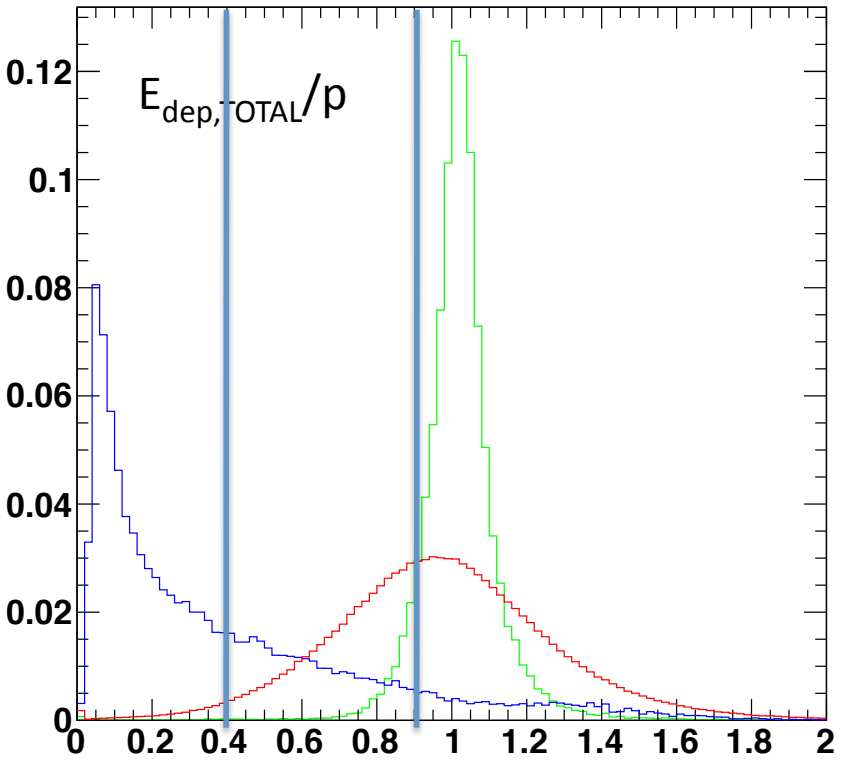
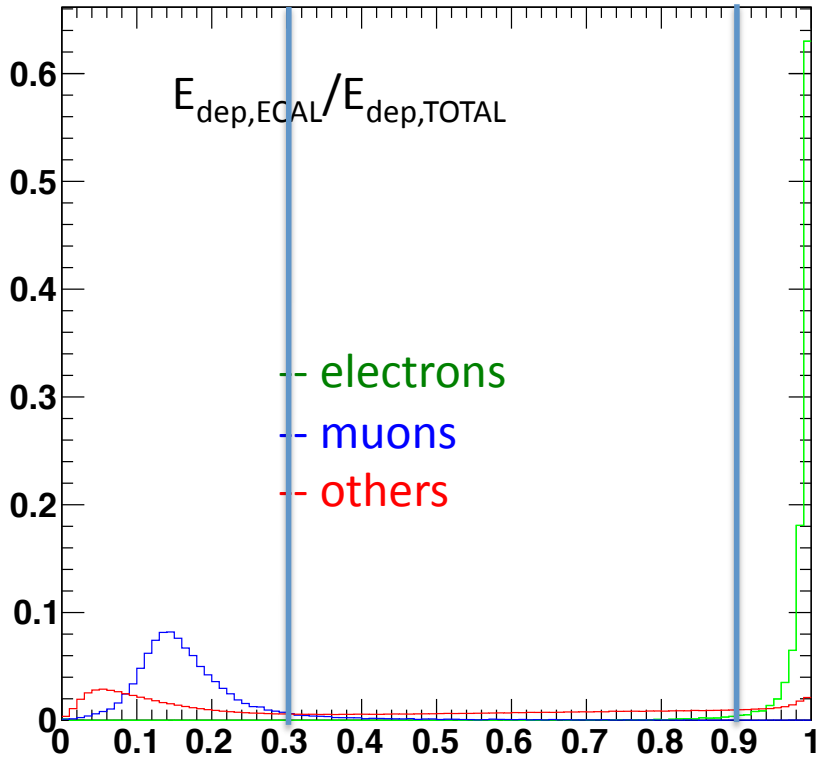
Lepton ID

- Motivations
  - Lepton ID particularly important in key Higgs analysis + reconstruction tools (jet clustering & flavor tagging)
  - Lepton ID performance has been significantly improved in latest PFA code
    - need to check its performance
- Setup
  - e+e- → ttH sample (50,000 events)
  - use ilcsoft v01-11
    - ILD_00 detector simulation & standard reconstruction
  - require |cosTheta|<0.7 for all studies for now

Conventional Lepton ID



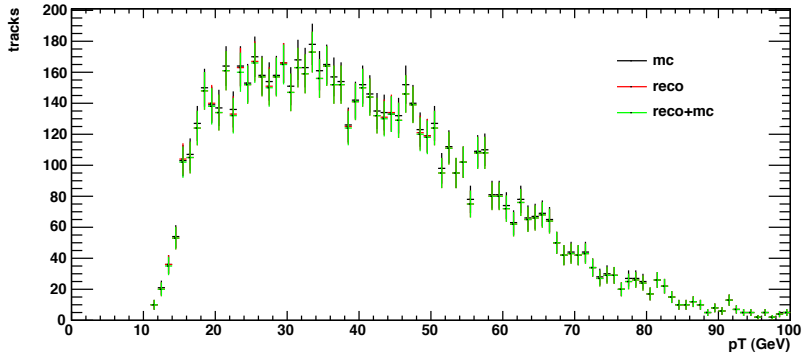


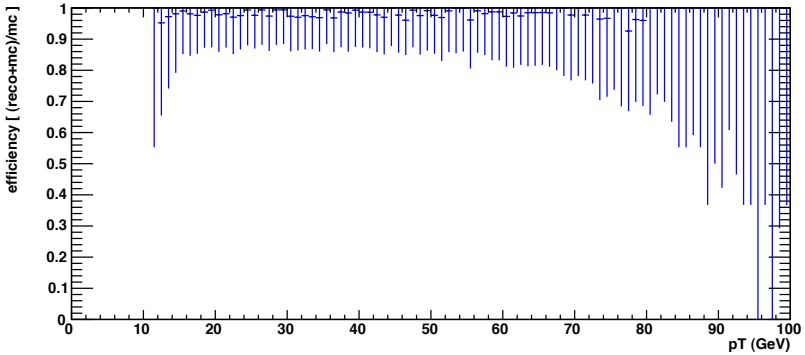
conventional electron definition: E/p>0.8 && Eecal/Etot>0.9
conventional muon definition: E/p<0.4 && Eecal/Etot<0.3

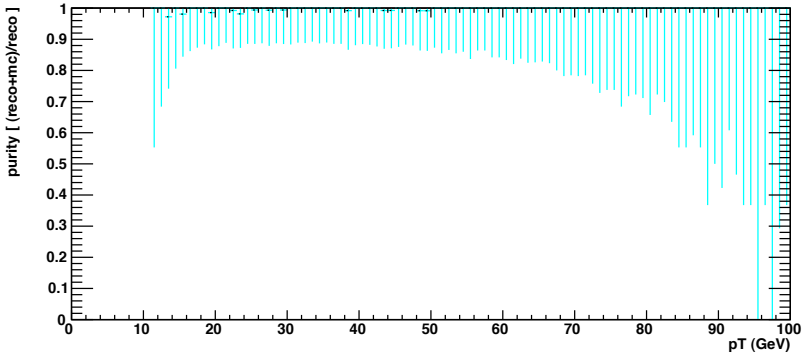
isolation requirement same as TTH analysis: E_{cone} < sqrt(6*(E_{lepton}-15))

Isolated Electrons

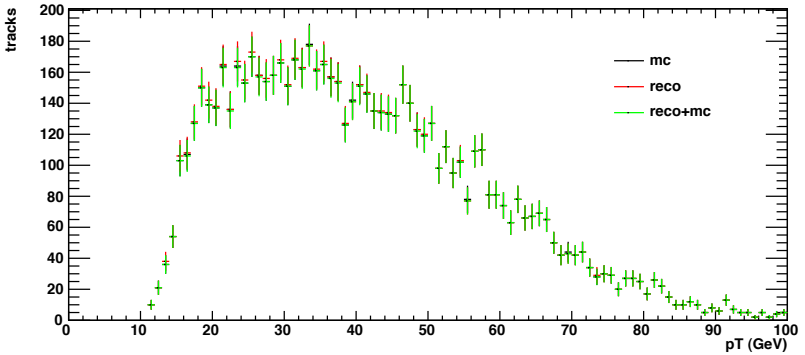
PandoaPFA PID

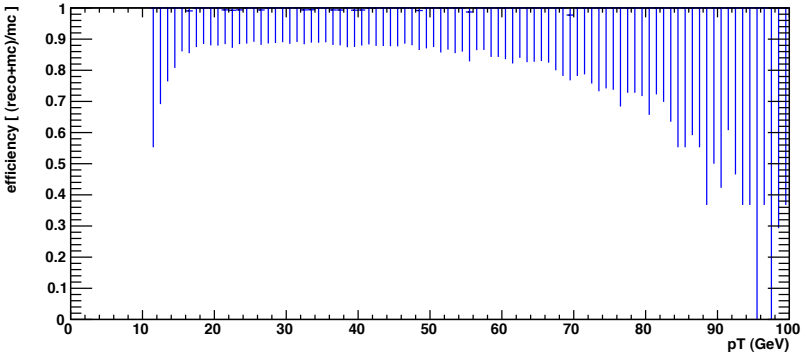


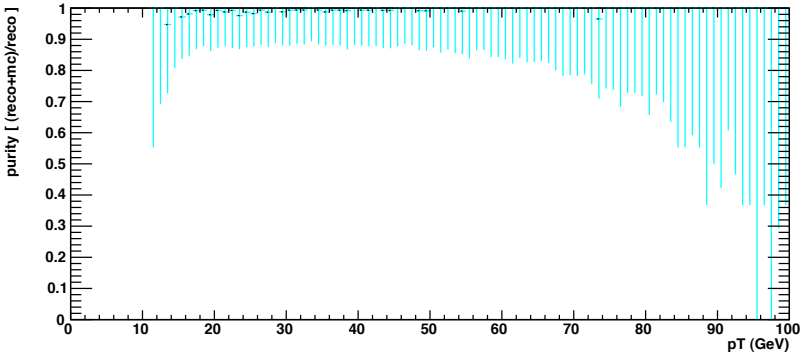




Conventional PID

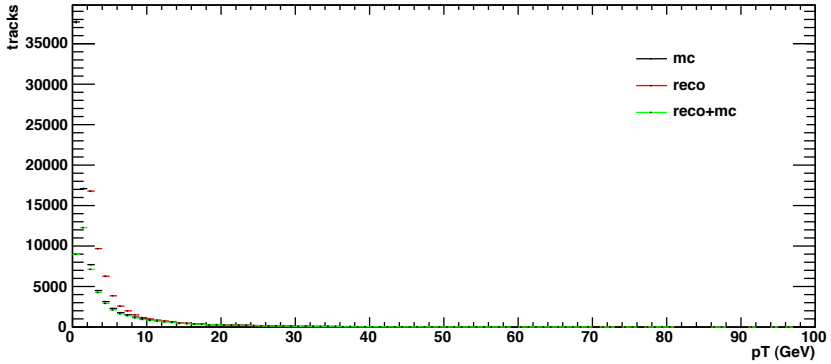


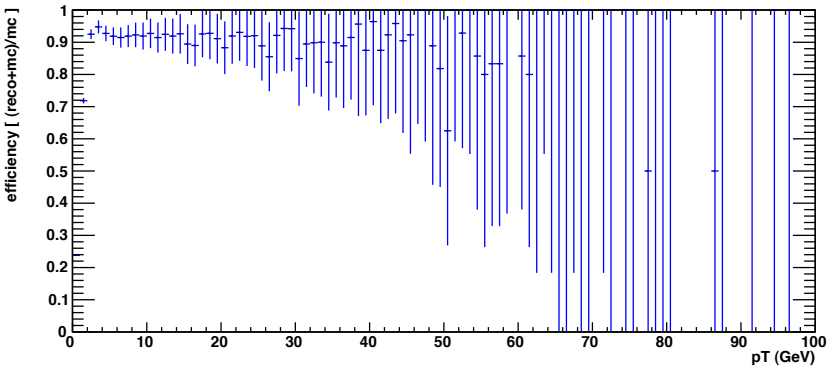


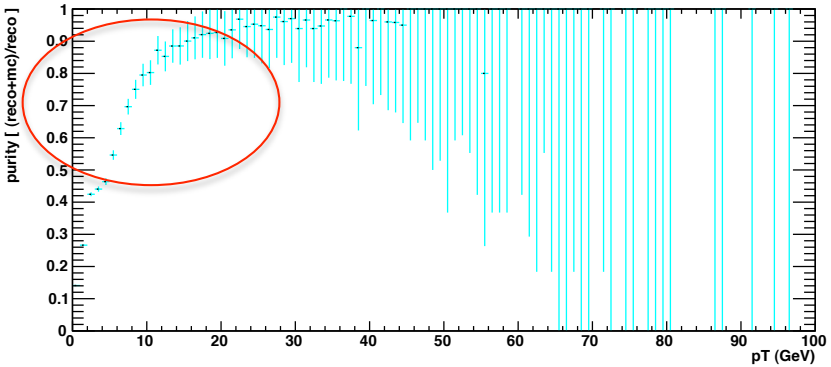


Non-isolated Electrons

PandoaPFA PID







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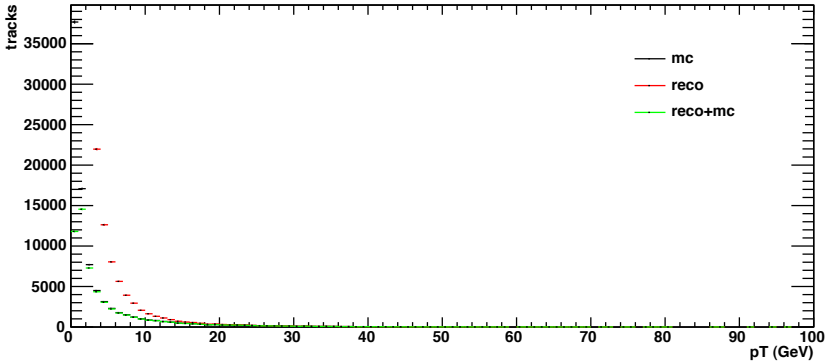
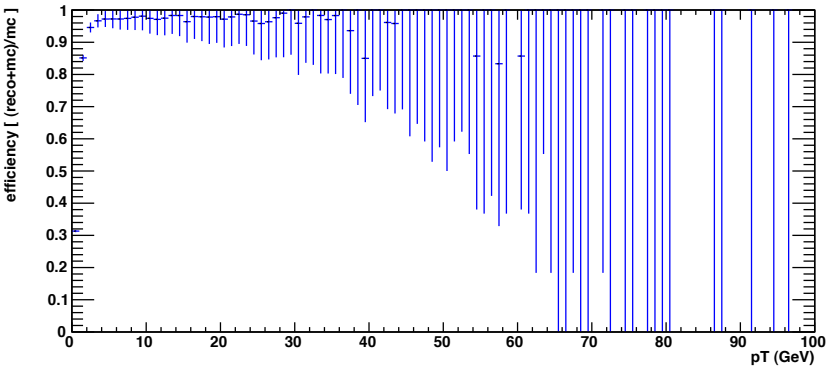
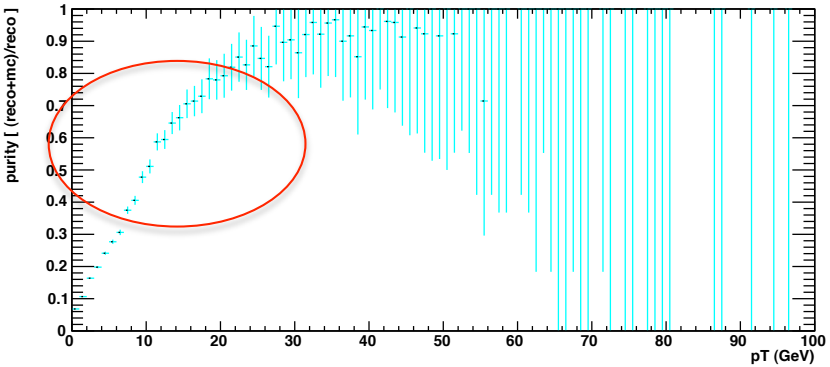
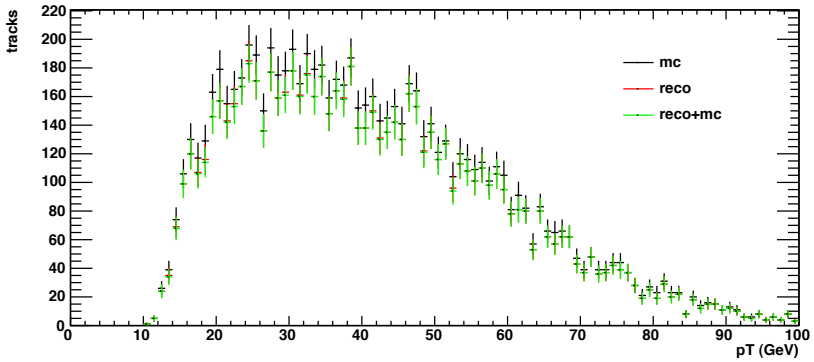


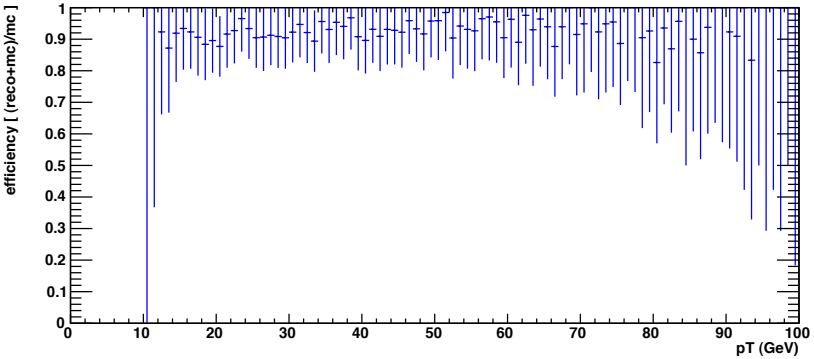


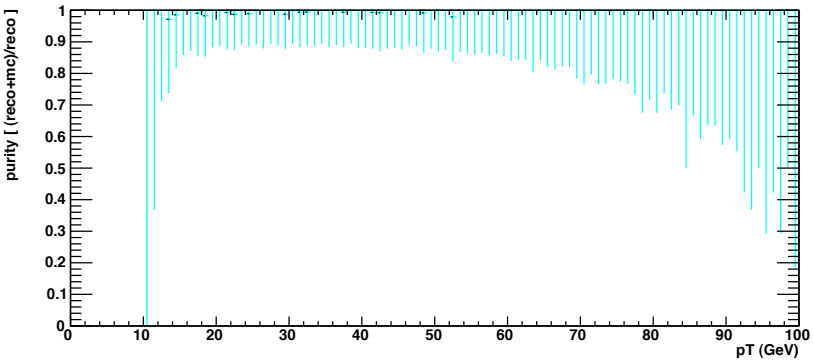


Isolated Muons

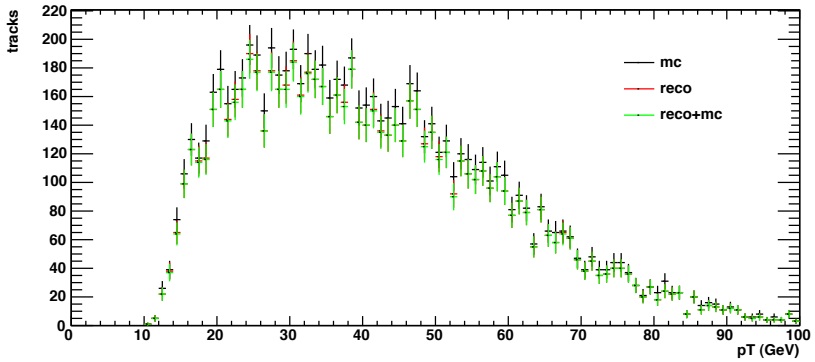
PandoaPFA PID

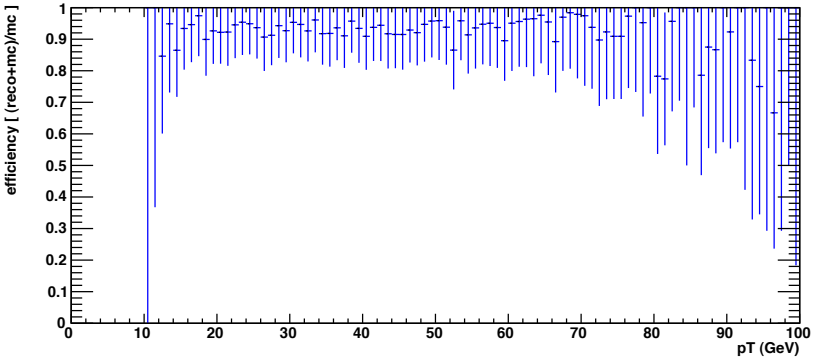


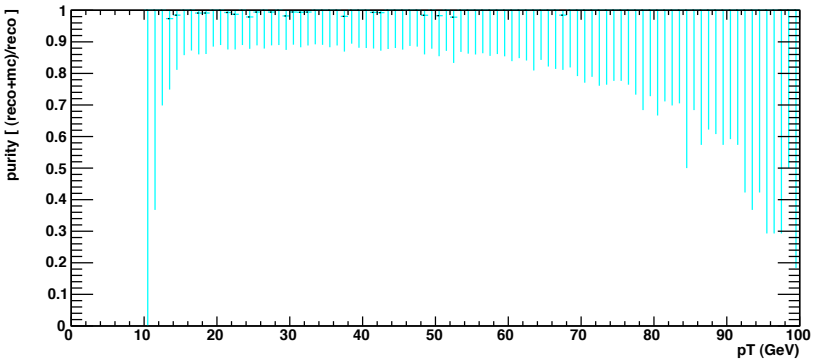




Conventional PID

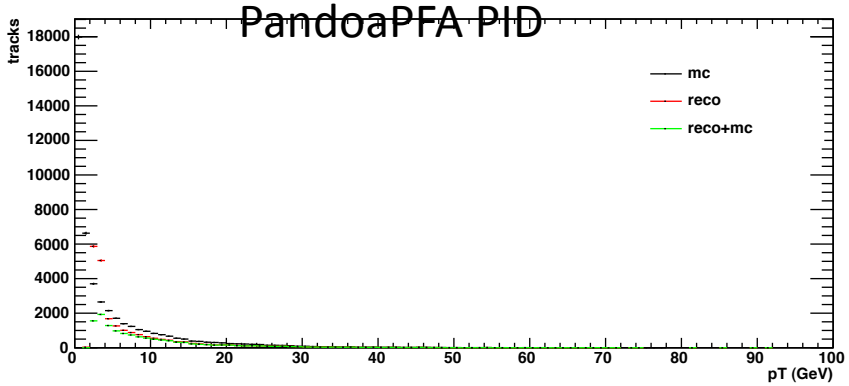


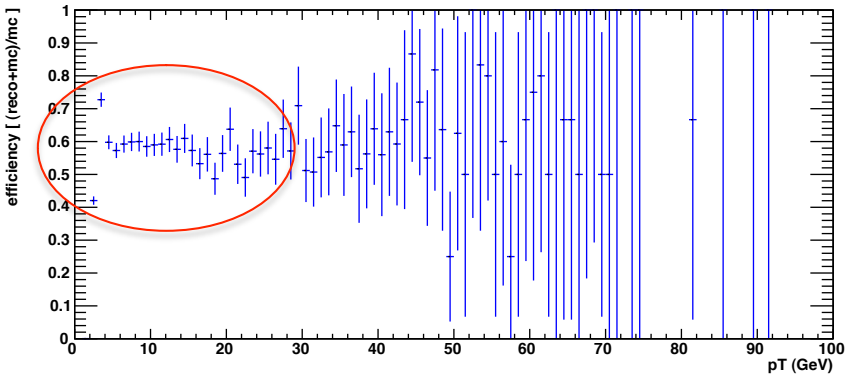


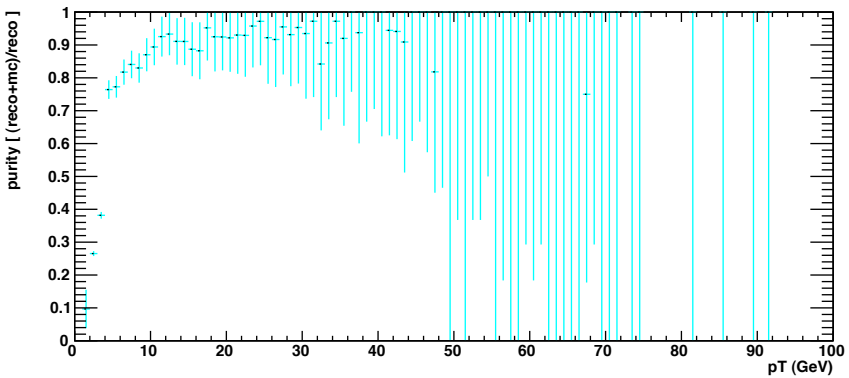


Non-isoalted Muons

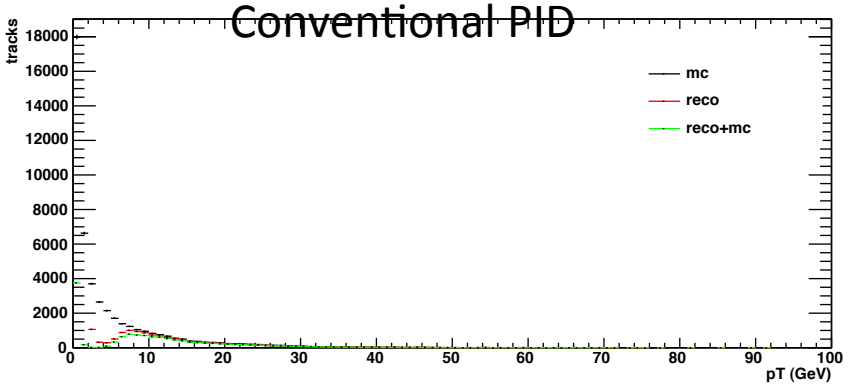
PandoaPFA PID

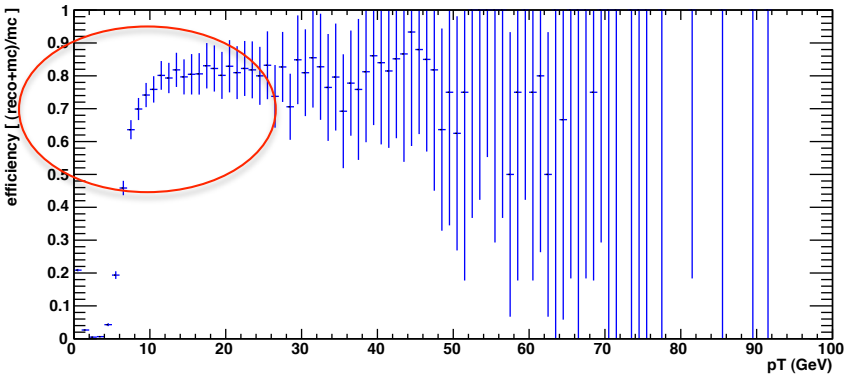


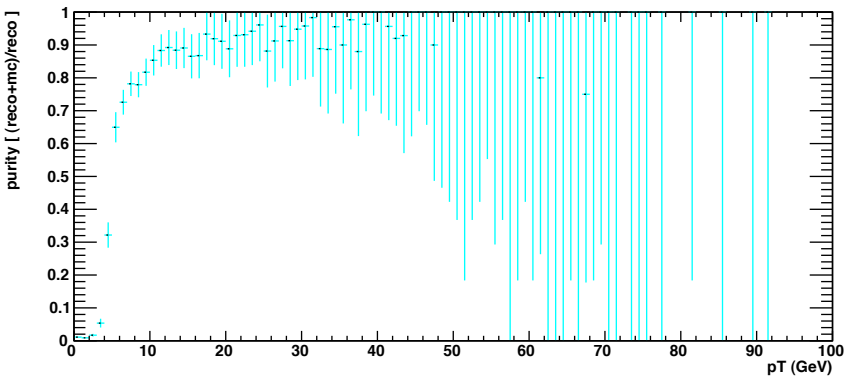




Conventional PID







Conclusions

- Similar performance seen for PandoraPFA PID & conventional PID for isolated leptons
- For non-isolated leptons (leptons in jets) some differences are seen:
  - PandoraPFA PID has better purity for low energy electrons
  - PandoraPFA PID has good muon efficiencies down to lower energies (but slightly poorer efficiencies for middle energy)
- Next steps:
  - crosscheck current results
  - look at angular dependence
  - look at dependence on isolation