Z(ee)+Jets update

→ Eta horns ...

Samples

- **Data**:
  - EM1TRK skim
  - Single EM triggers
  - Run range: 20 April 2002 - 28 June 2004 (Runs 151,817 - 194,566)
  - Rejecting bad runs (CAL, SMT, CFT, Jet/Met, Lumi)
  - $323 pb^{-1}$
  - No T42 applied
  - Jetcorr v5.0
  - Processed with ATHENA (v01-05-02)

- **MC:**
  - Z/Gamma* > e^+e^- +X: 400k Pythia
  - Zj->eej: 150k Alp+Pythia
  - Zjj->eejj: 180k Alp+Pythia
  - Zjjj->eejjj: being processed
  - Processed with ATHENA (v01-05-02)

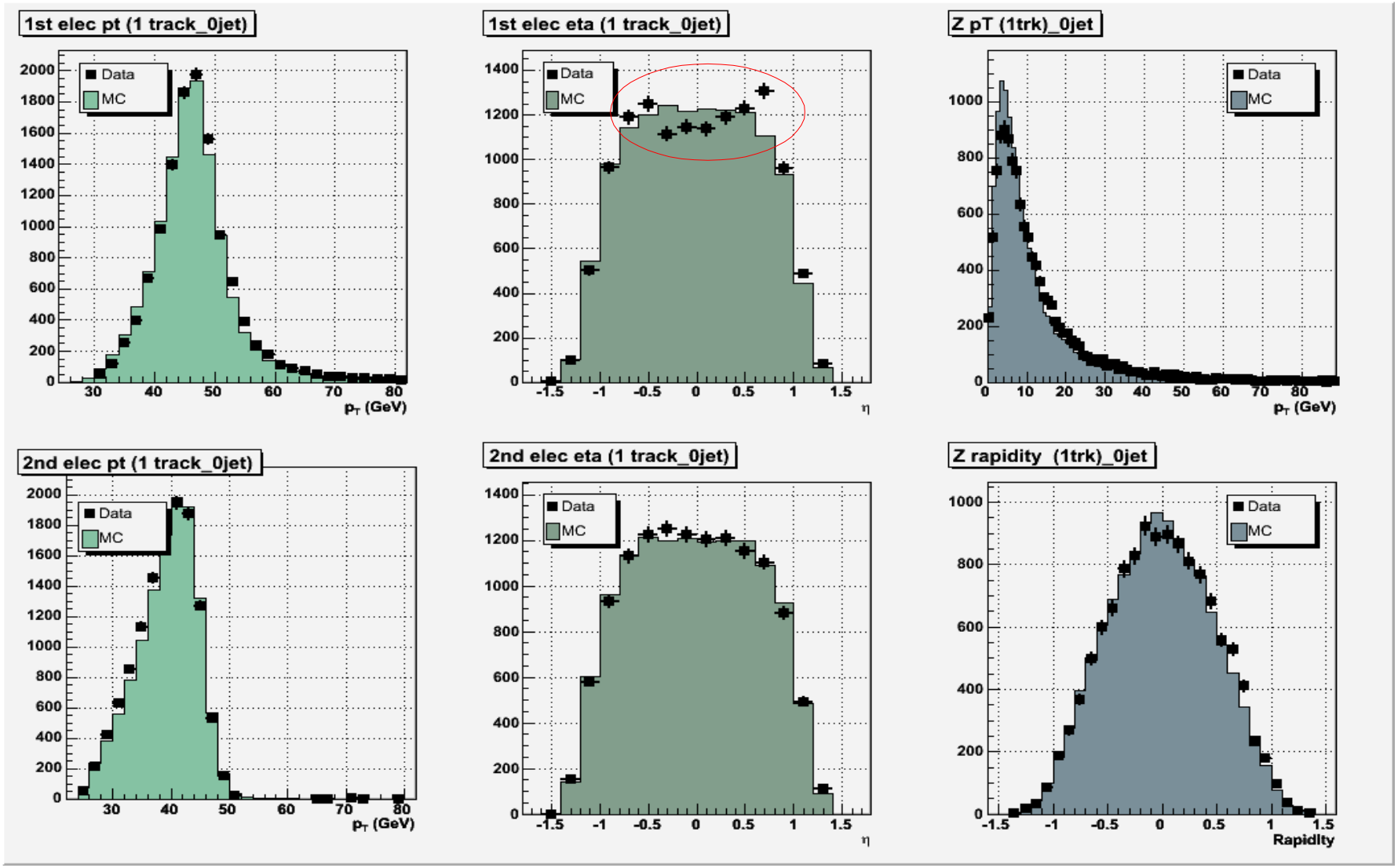
Selection Criteria

- Removing bad runs/LBNs & dupli events
- PVX cut: |z|<60cm
- Using unprescaled single EM triggers
- Electron selection:
  - |ID|=10,11
  - EMF>0.9
  - Iso<0.15
  - HMx(7)<12
  - p_T>25GeV
  - |eta|<1.1
  - Including phi cracks
- Z selection:
  - 75GeV < M_{ee} < 105GeV
  - At least one trackmatched electron
  - At least one electron needs to fire the trigger
- Jet selection:
  - 0.05 < EMF < 0.95
  - HotF < 10
  - N90>1
  - CHF<0.4
  - L1conf
  - JES corrected p_T>20GeV
  - |eta|<2.5
  - Removal of jets overlapping with electrons from Z within dR of 0.4

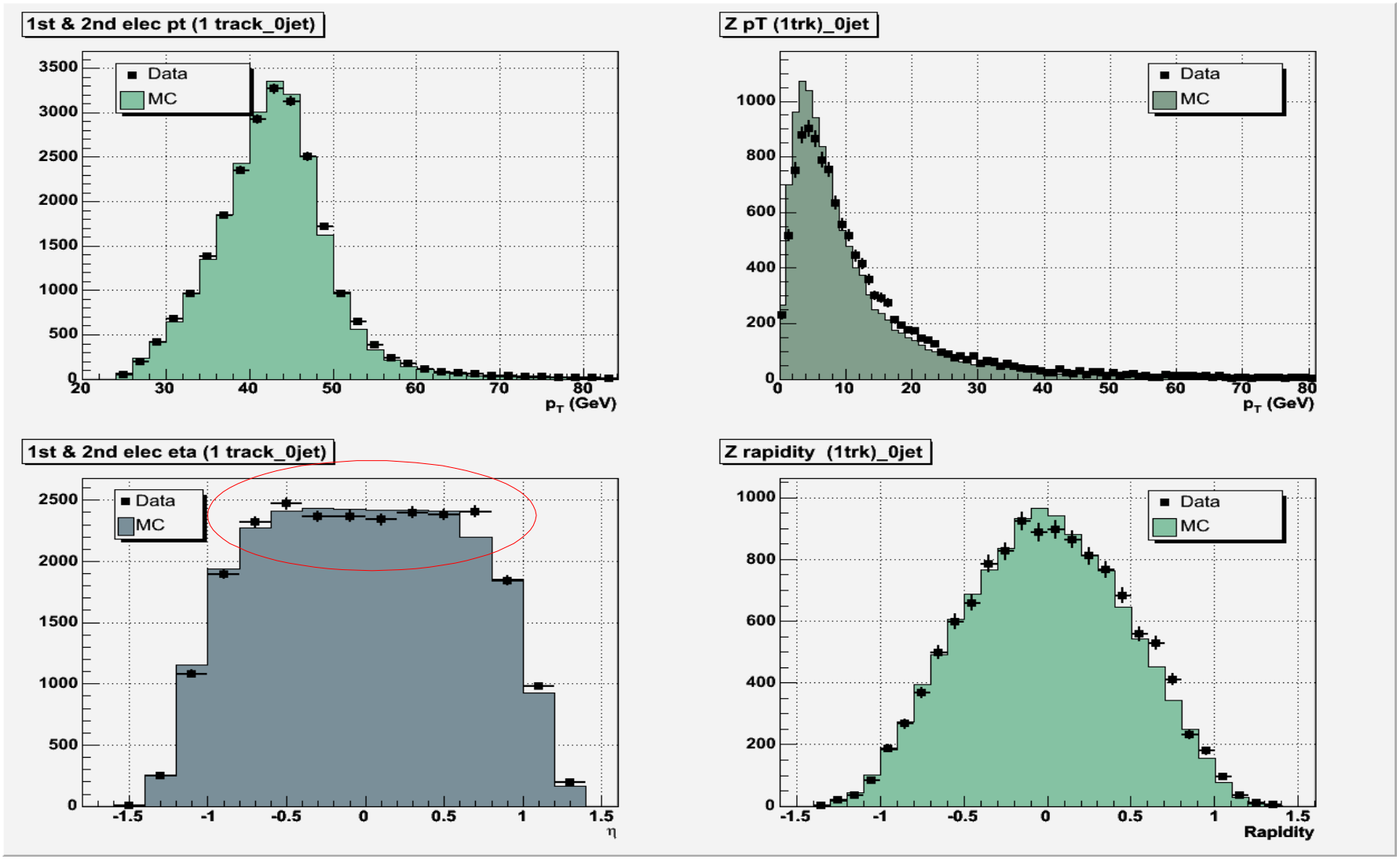
Data vs MC

- MC = Pythia sample
- MC: smearing: pT' = pT c [1+Gauss(0,f)] c = 1.003, f = 0.045
- Data: background subtracted based on sidebands (40-75GeV & 105-140GeV)
- Normalization between data and MC: same number of events

Data vs MC: 1st & 2nd electron separately



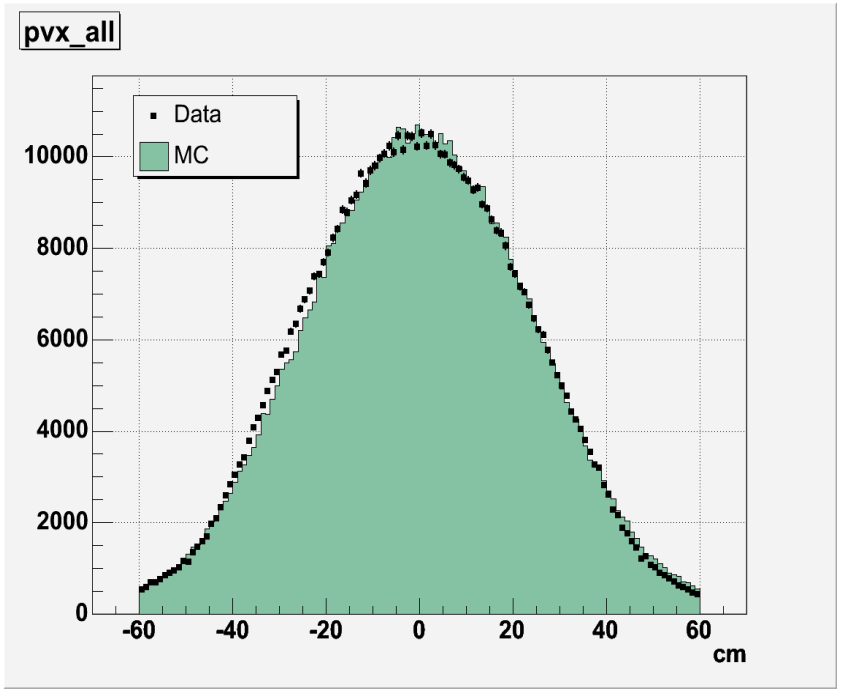
Data vs MC: combining 1st & 2nd electron



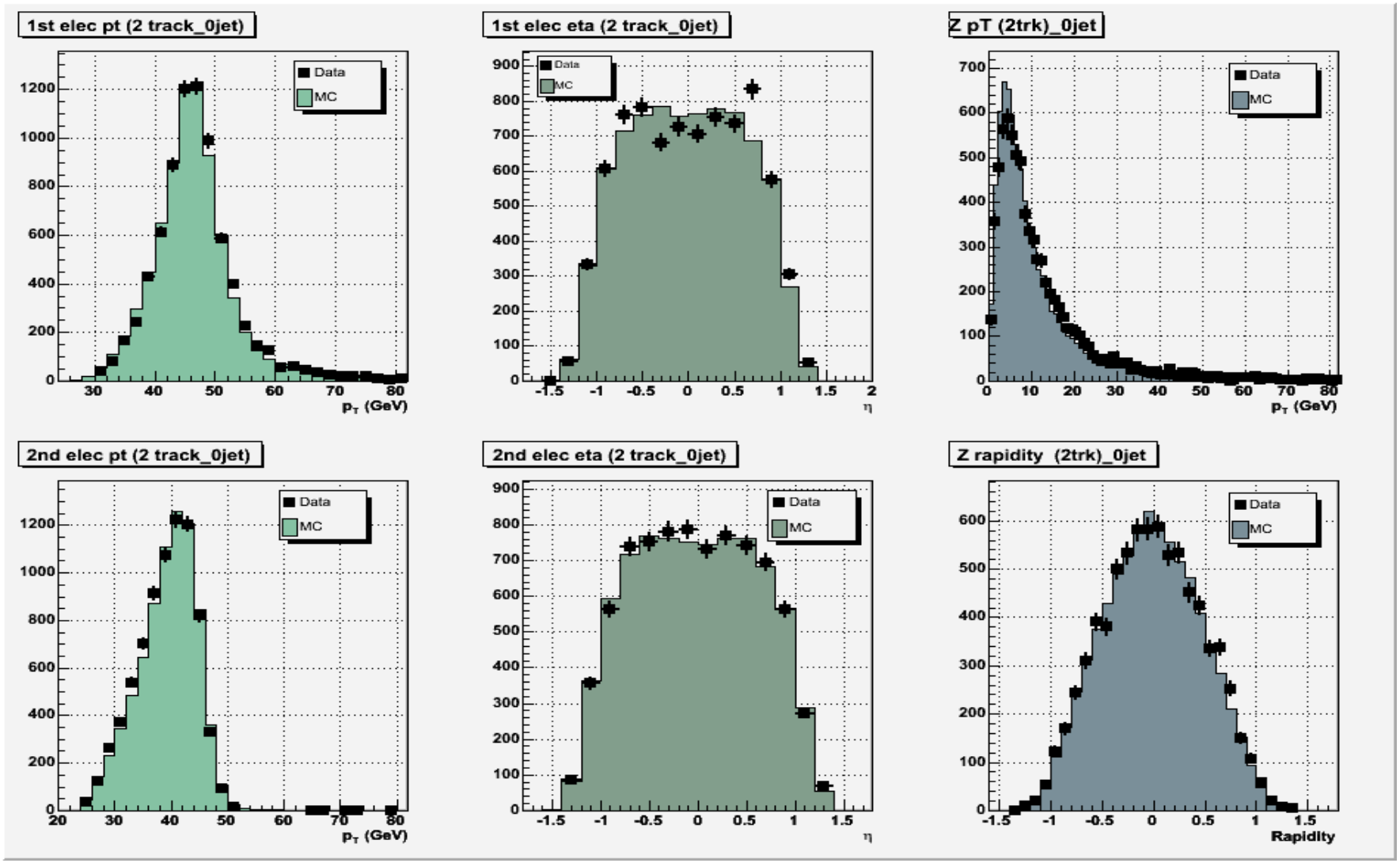
Eta 'horns'

- 2 possibilities:
  - "Horns are signal" -> inefficiency at eta=0 (tracking, EM)
  - "Horns are background" -> sideband background subtraction doesn't work

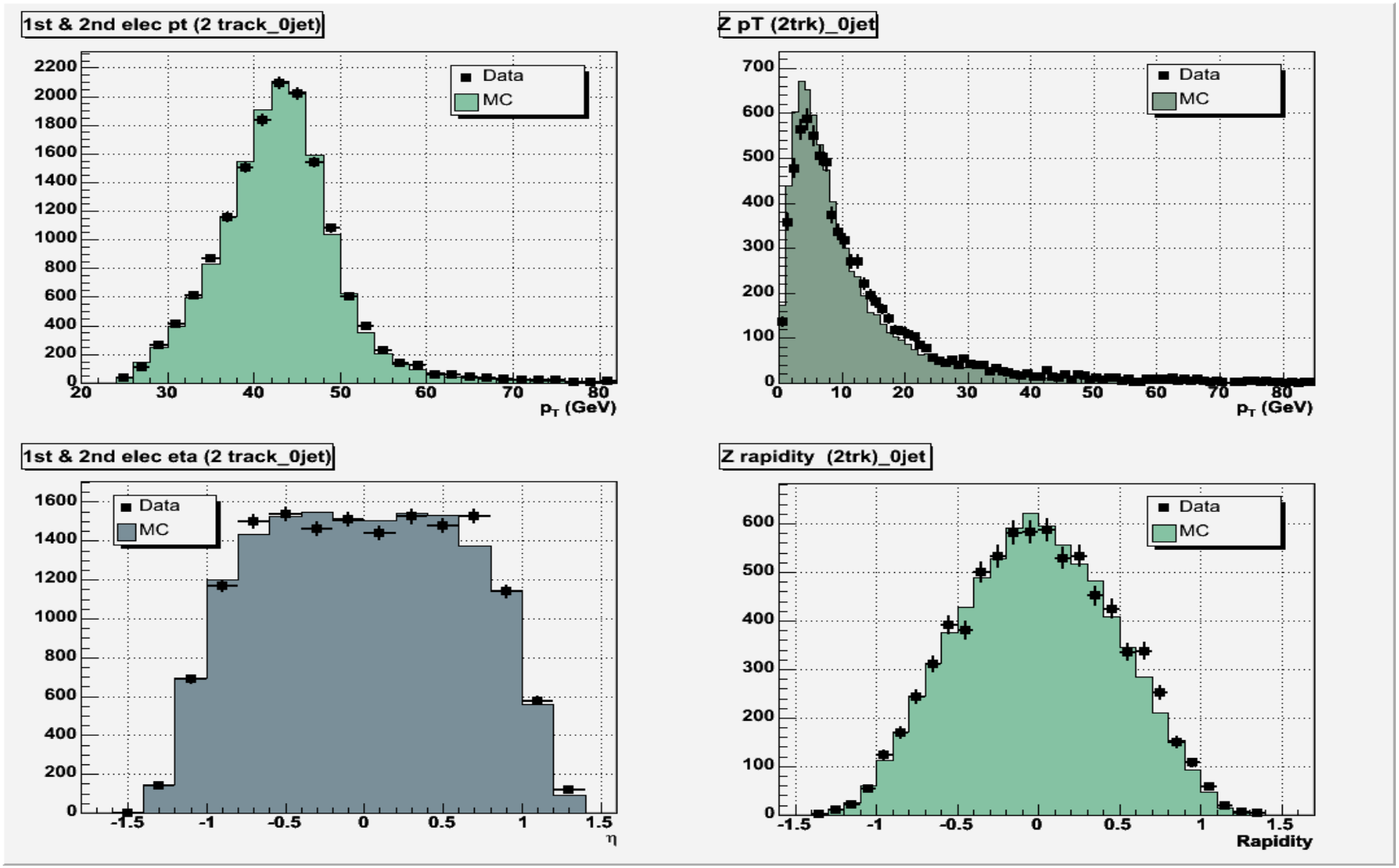
- Did a few random checks:
  - ✗ Cutting |eta|<0.8 to avoid ICR effects
  - ✗ Eleminating trigger requirement
  - ✗ Splitting up data sample in v12 and pre-v12
  - ✗ Checking for hot cells (detector-eta vs detector-phi)
  - ✗ Redo with 2 trackmatches
  - ✗ Tightening PVX cut (|pvx|<20cm) →
  - ✗ Excluding phi cracks
  - ✗ Raising pT cut to 35GeV



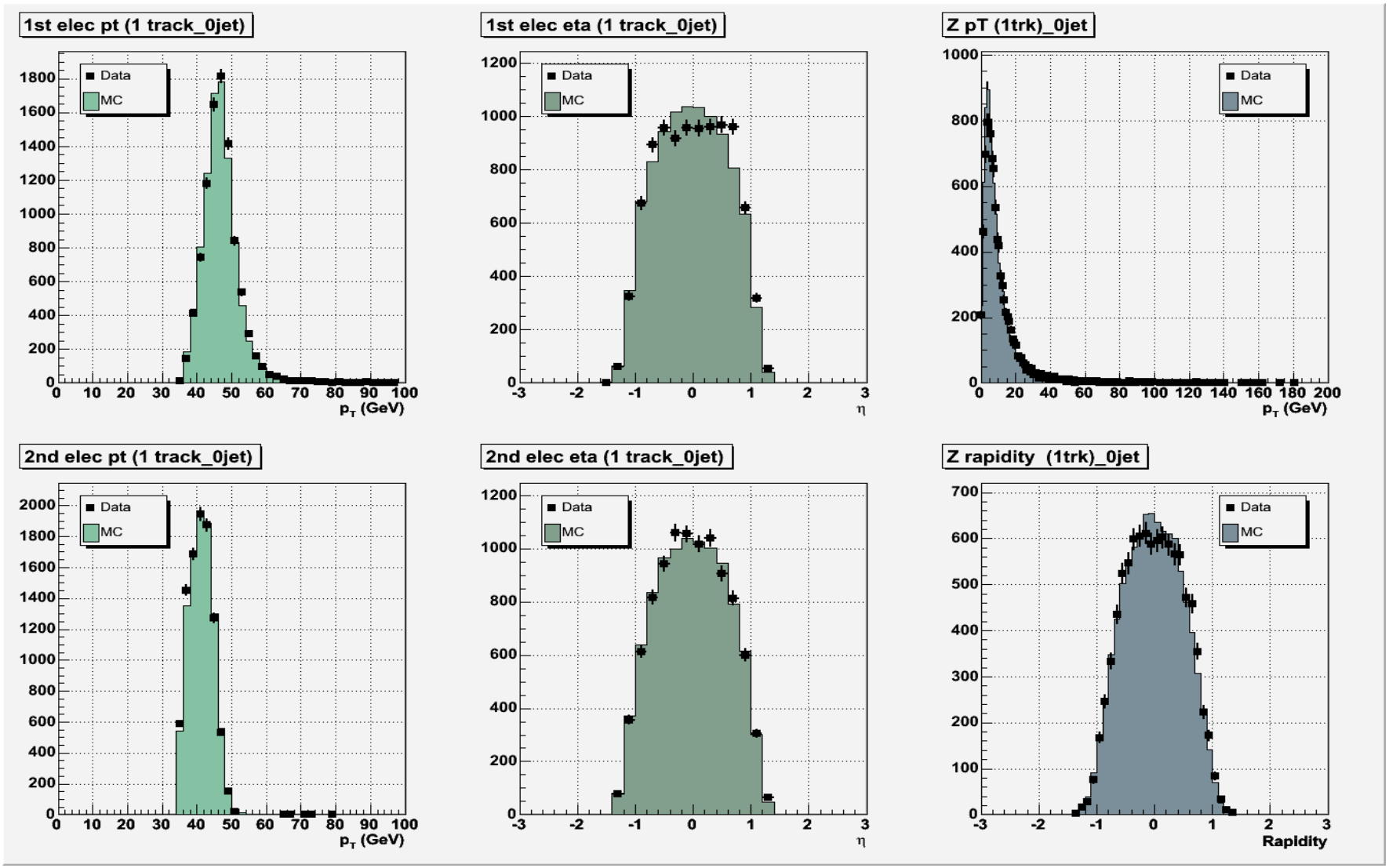
Requiring 2 Track Matches: 1st & 2nd electron separately

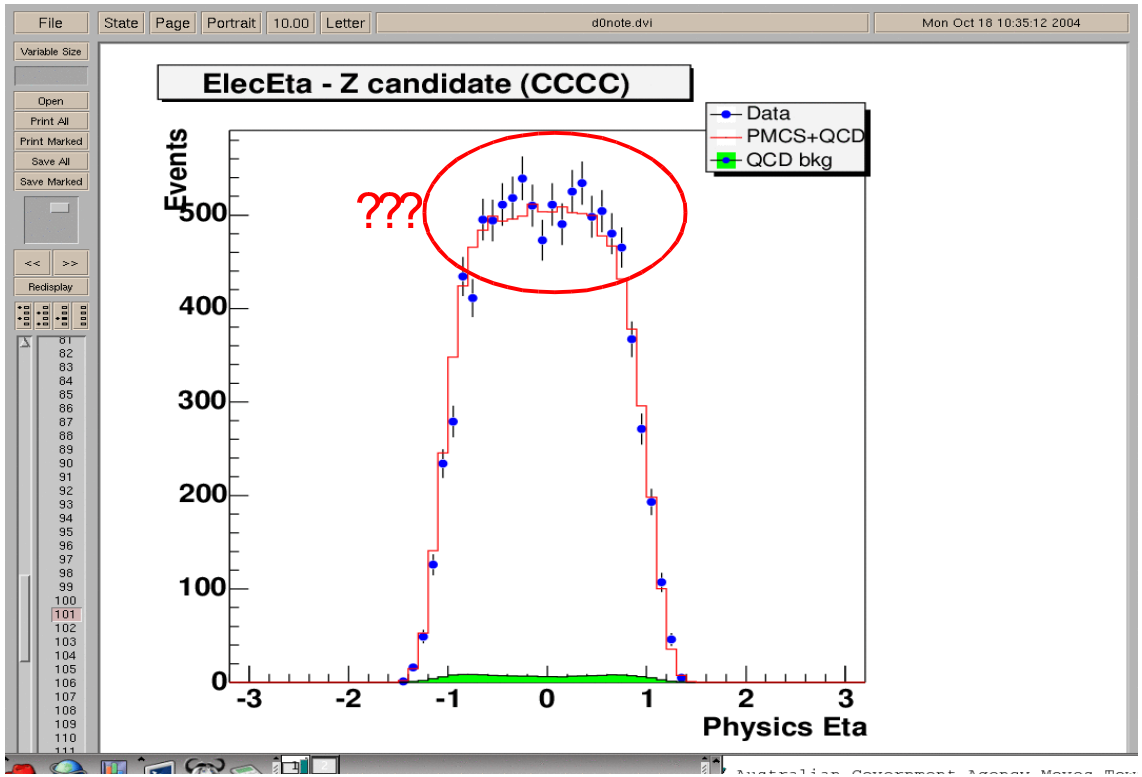


Requiring 2 Track Matches: 1st & 2nd electron combined



Requiring 1 trk with pT>35GeV



A few more things to check ...

- Resolution effect ?
- EM-/Tracking efficiencies vs eta
- Plot properties of electrons in horn regions
- Comparing with James
- Comparing with WZ group