Missing E_t software progress report

CDF SUSY Meeting

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Recap: Uneven metPhi distribution

- When running TowerValidation, etc., on minimum bias events, plots of missing $E_t \phi$ would be expected to be flat.
- This turns out not to be true – Missing E_t vector preferentially points down.
- Would correcting for x, y, and z vertex, as well as beam slope, help?
- To do this, changes have been made in several files in calorimetry and MET packages.
- Method: get vertex and slope information in CdfMetModule, use it to recalculate Locations for each calorimetry tower.
- With updated Locations, calculate new CdfMet object.

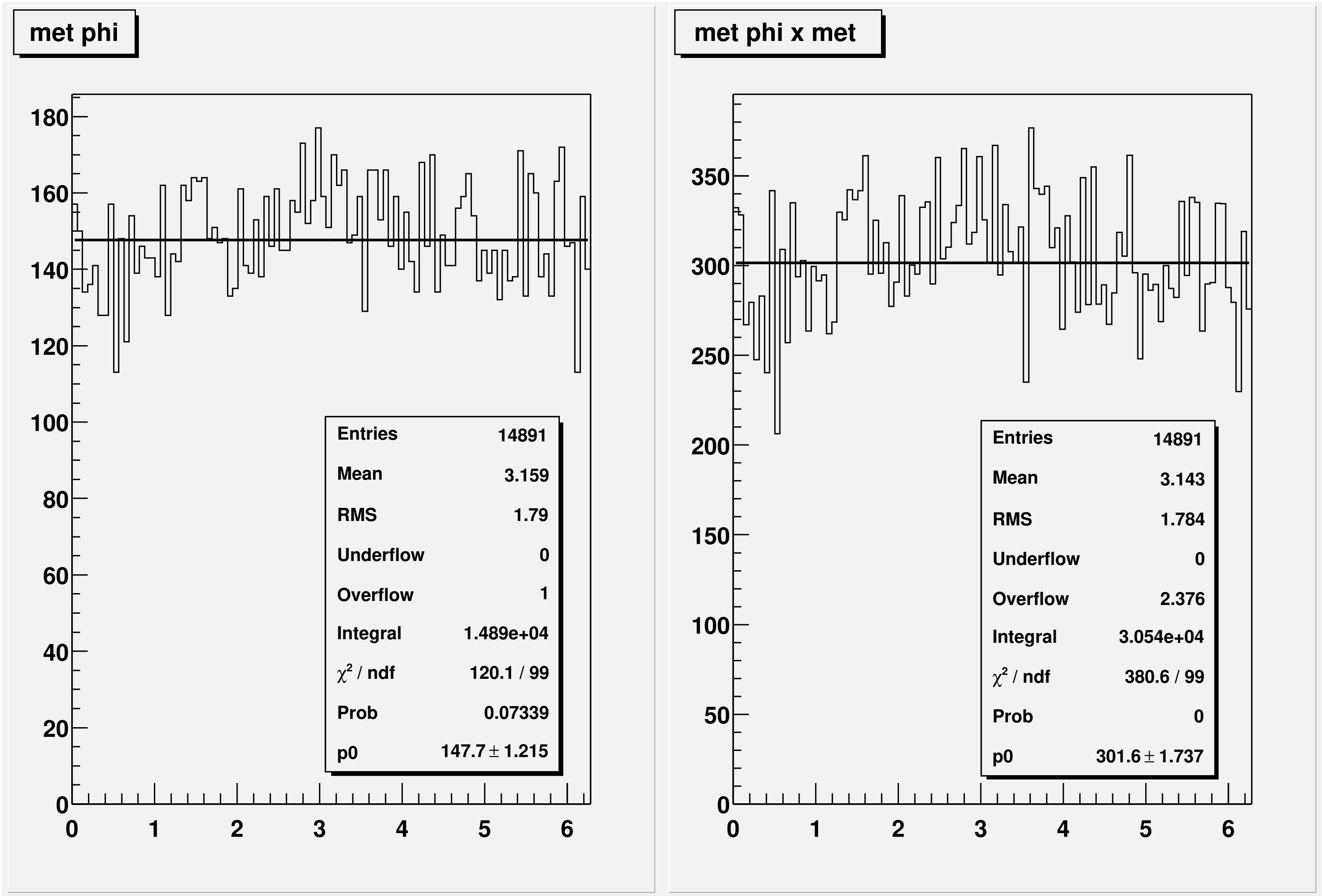
Current Status – Minimum Bias simulation

- Tests on simulated data proceeded – larger data set for minimum bias used (15000 events with 4 mm y-vertex offset, 15000 without.)
- Results of histograms from TowerValidation compared, with and without corrections.
- One subtle correction added (actually, put back in) to phi calculations: "centre-of-gravity (COG)" correction.
  - My version of Locations.cc assigns phi angles to each tower assuming true value of phi is in the centre of the cell.
  - However, each tower when hit takes information from its two PMTs to find the actual phi of the energy deposited.
  - COG correction is now made to vertex corrected phi (though not in the best place in the code right now.)

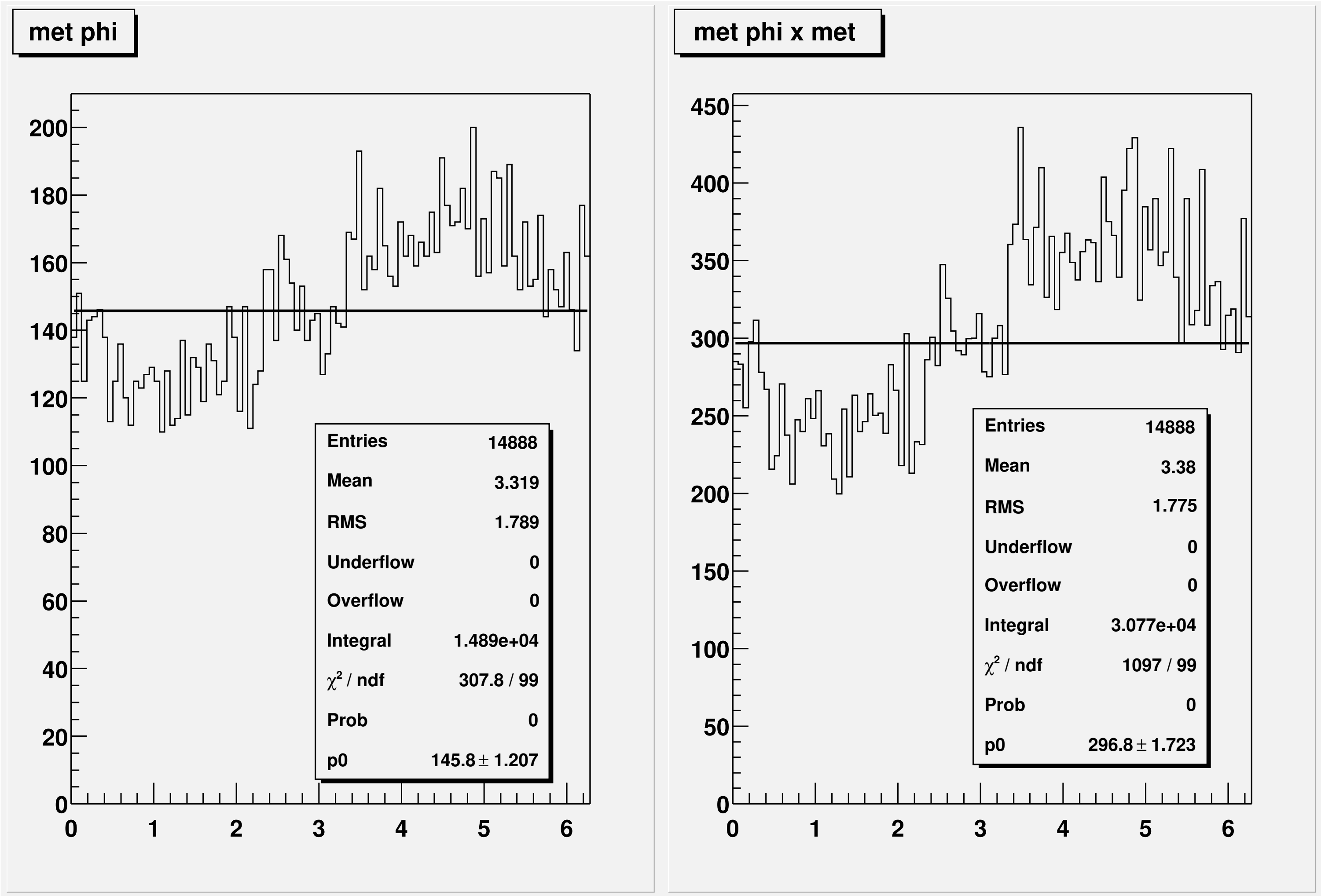
Current Status – "Fake Event" electrons

- Cleaner results might come from simulated "fake event" electrons.
- 100000 events generated with single electrons, randomly distributed in eta, phi, with constant $p_T = 30$ GeV/c.
- Again, two data sets: one with 4 mm y-vertex offset, one without.
- One bug noted in electron studies – in all events, vxprim could not find enough information to construct z-vertex.
  - PhysicsTowerDataMaker would only produce new Locations object if z-vertex changed from default of zero.
  - Changed: now, if x, y, or z-vertex != 0, new Locations object made.
  - Note that this change made no difference to minimum bias results.

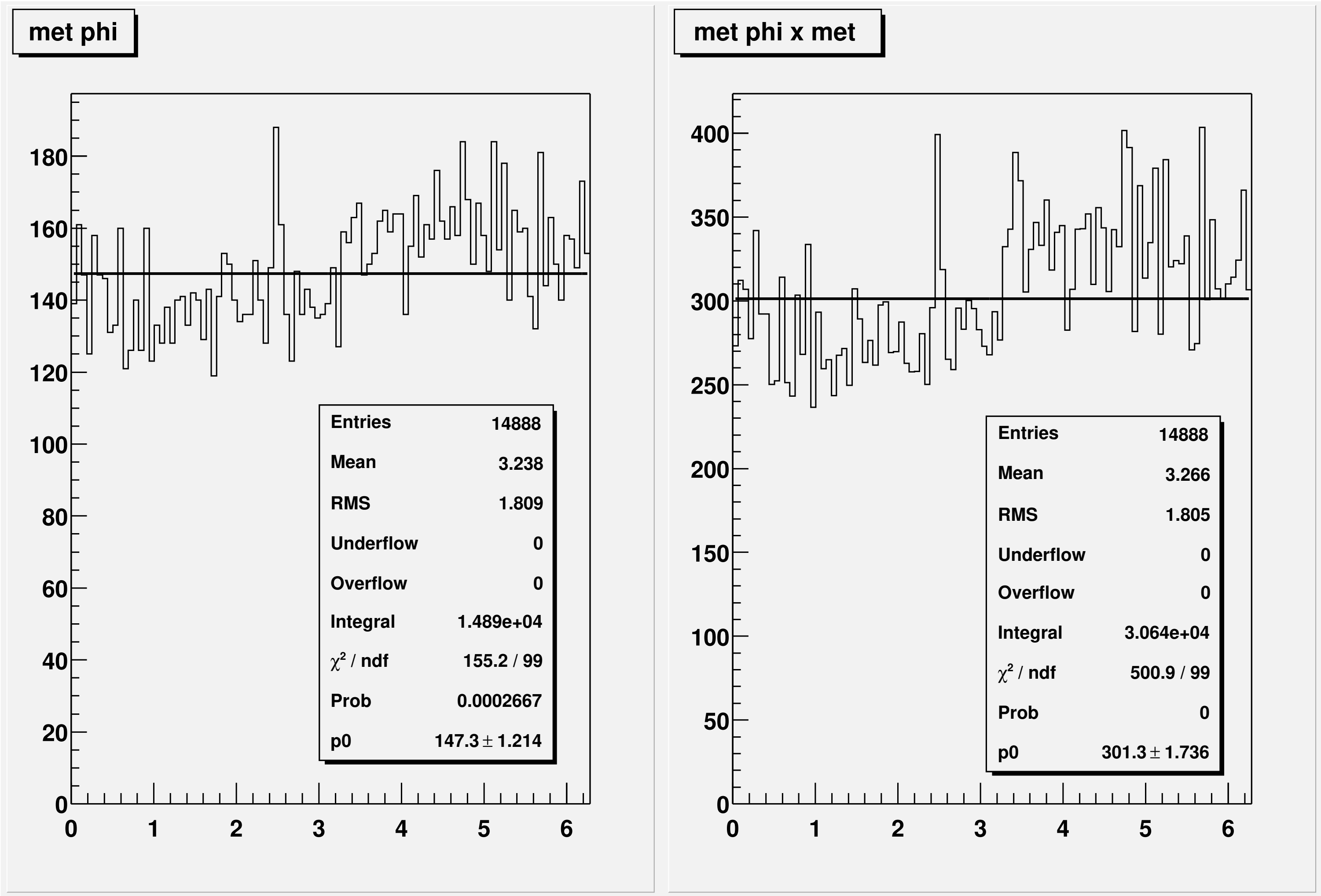
Results for minimum bias events generated without offset.



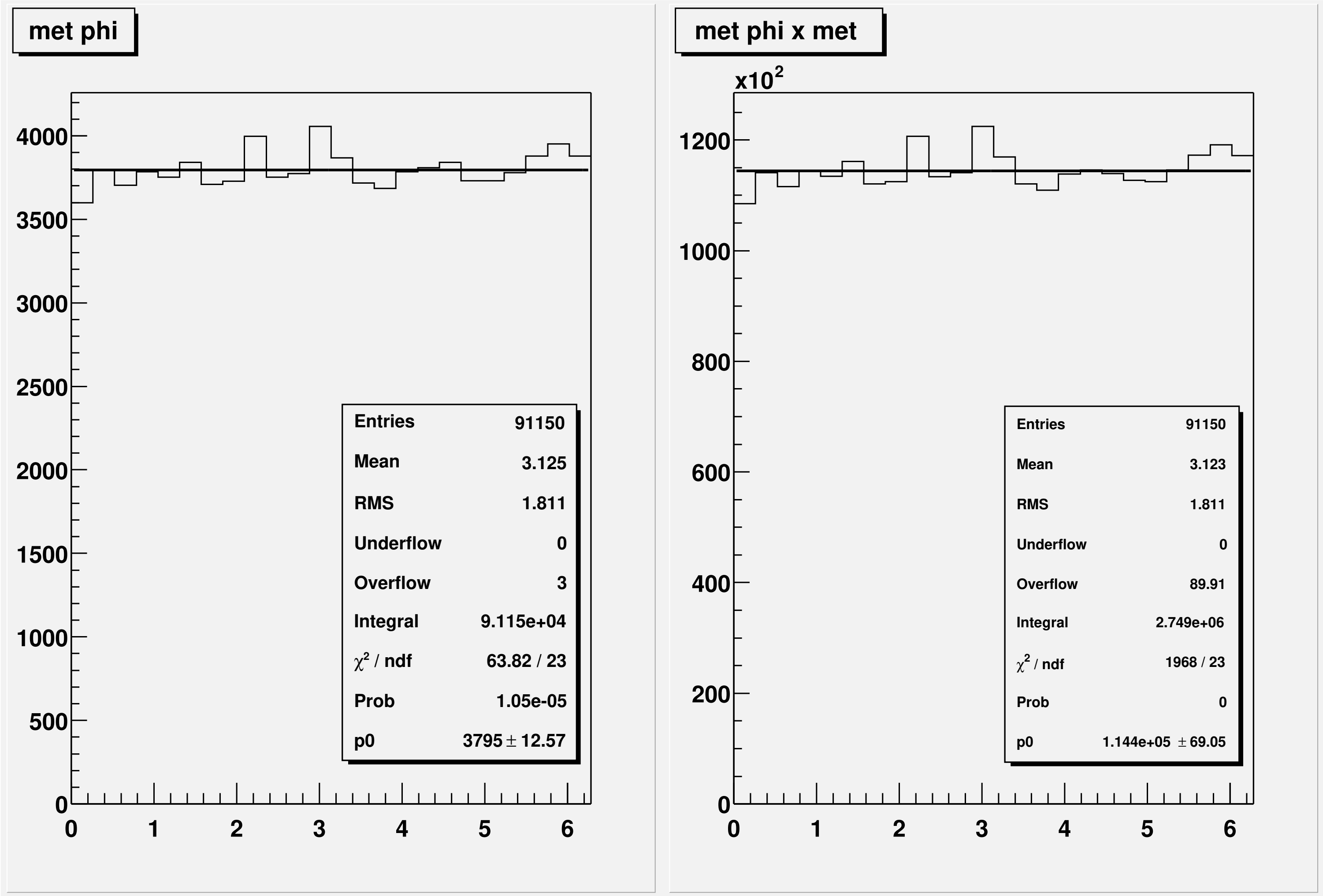
Results for minimum bias events generated with 0.4 cm y-offset, but no vertex corrections.



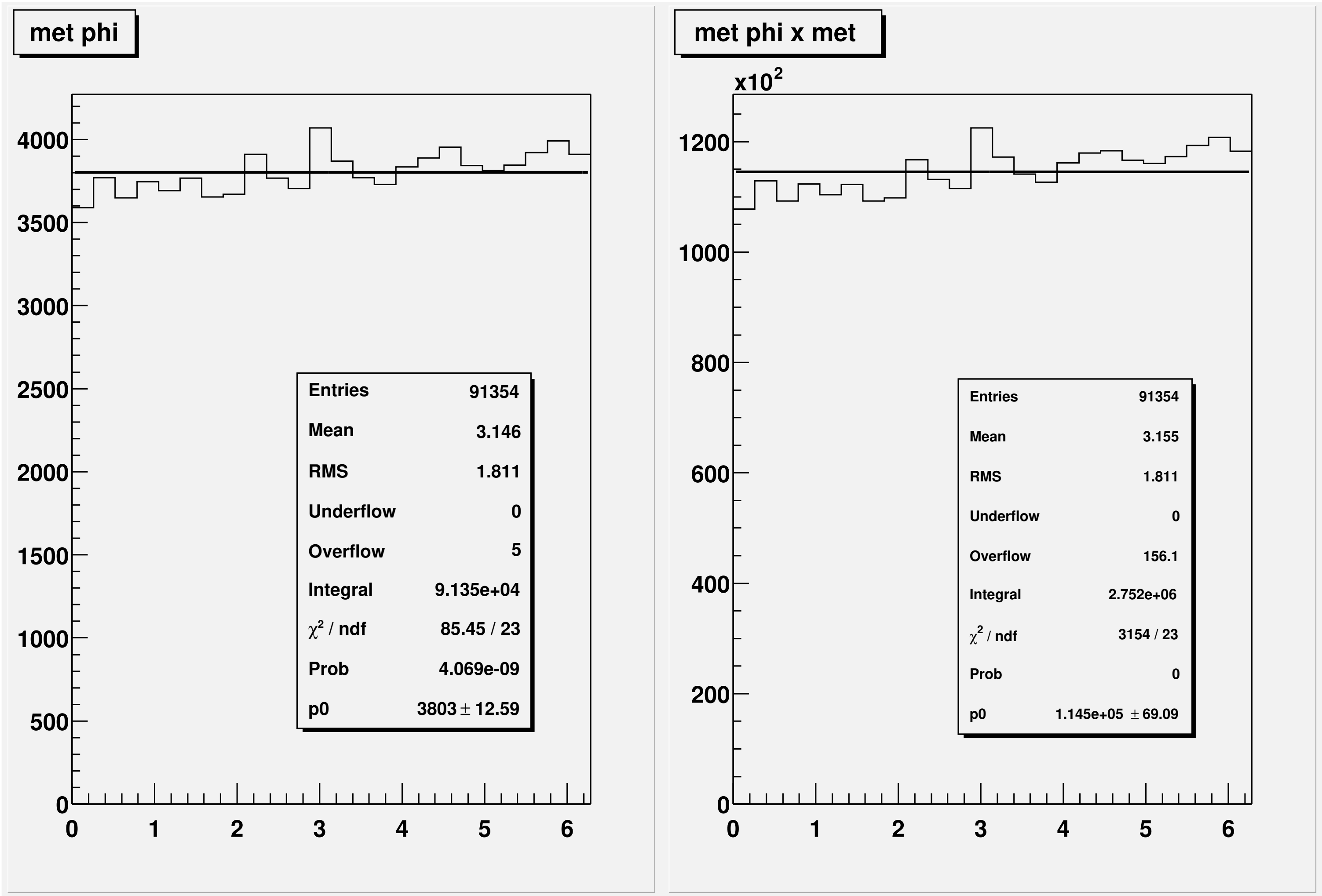
Results for minimum bias events generated with 0.4 cm y-offset, corrected for vertex and COG.



Results for single electrons generated with zero offset.



Results for single electrons generated with 0.4 cm offset.



Results for single electrons generated with 0.4 cm offset, corrected.