Multiplicity dependence of J/psi yield

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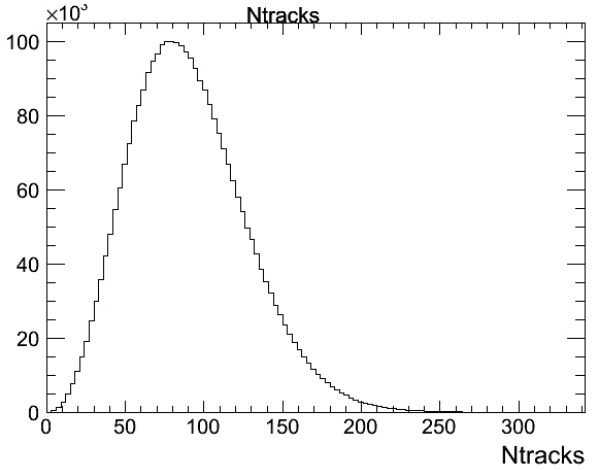
Di-lepton meeting

12-Feb-14

Outline

- Studied N_track dependence of dN/dpT and R_FB

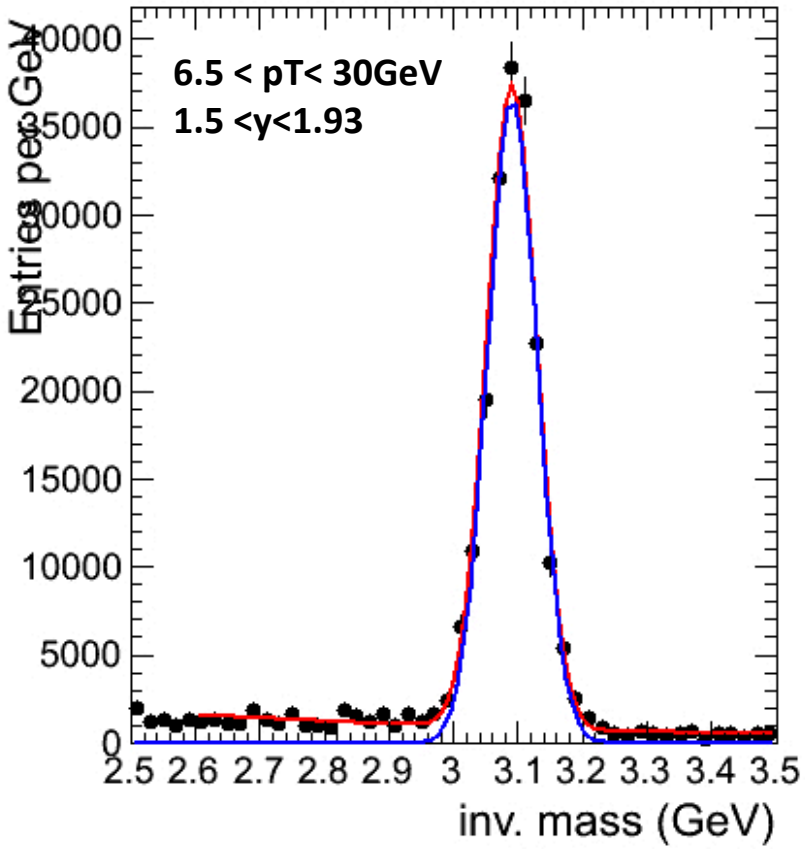


- Events are divided into 5 N_track bins
  {60 – 80 – 100 – 120 – 150}

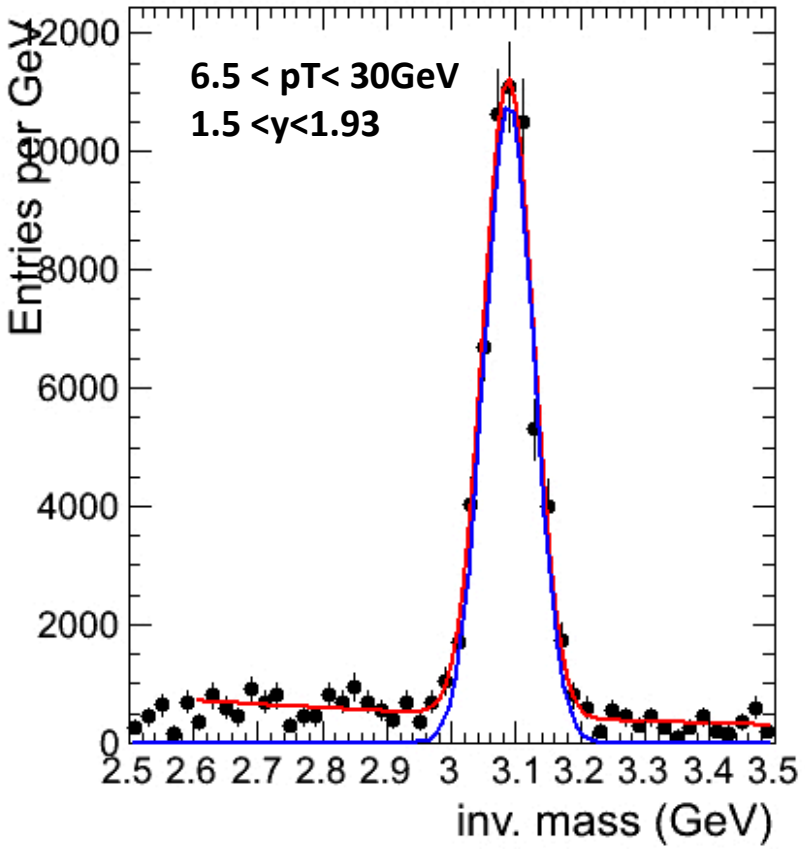
- For the sake of quickness
  - Inclusive J/psi yield was extracted
  - Efficiency, Acceptance is not corrected.
  - Gaussian function was used for fitting (Likehood)
  - Same event+trigger selection, pT and rapidity binning are identical to the common setup (https://twiki.cern.ch/twiki/bin/viewauth/CMS/PAcharm2013)

Gaussian Fitting example

Lowest N^{trk} bin
$N^{trk} < 60$

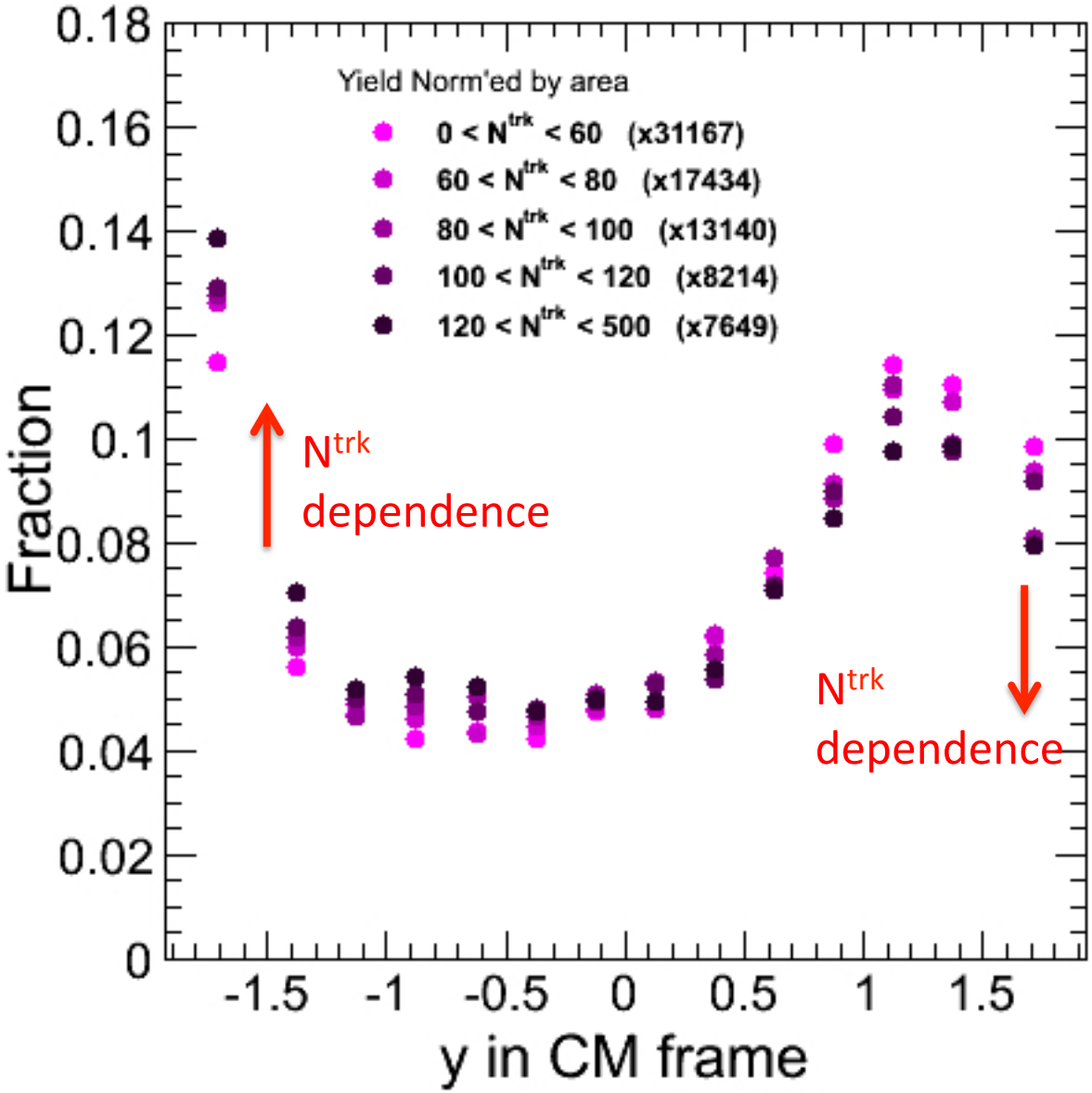


Highest N^{trk} bin
$N^{trk} > 120$



- Exponential function used for background fit
- Rest of fitting plots can be found in the backup slides

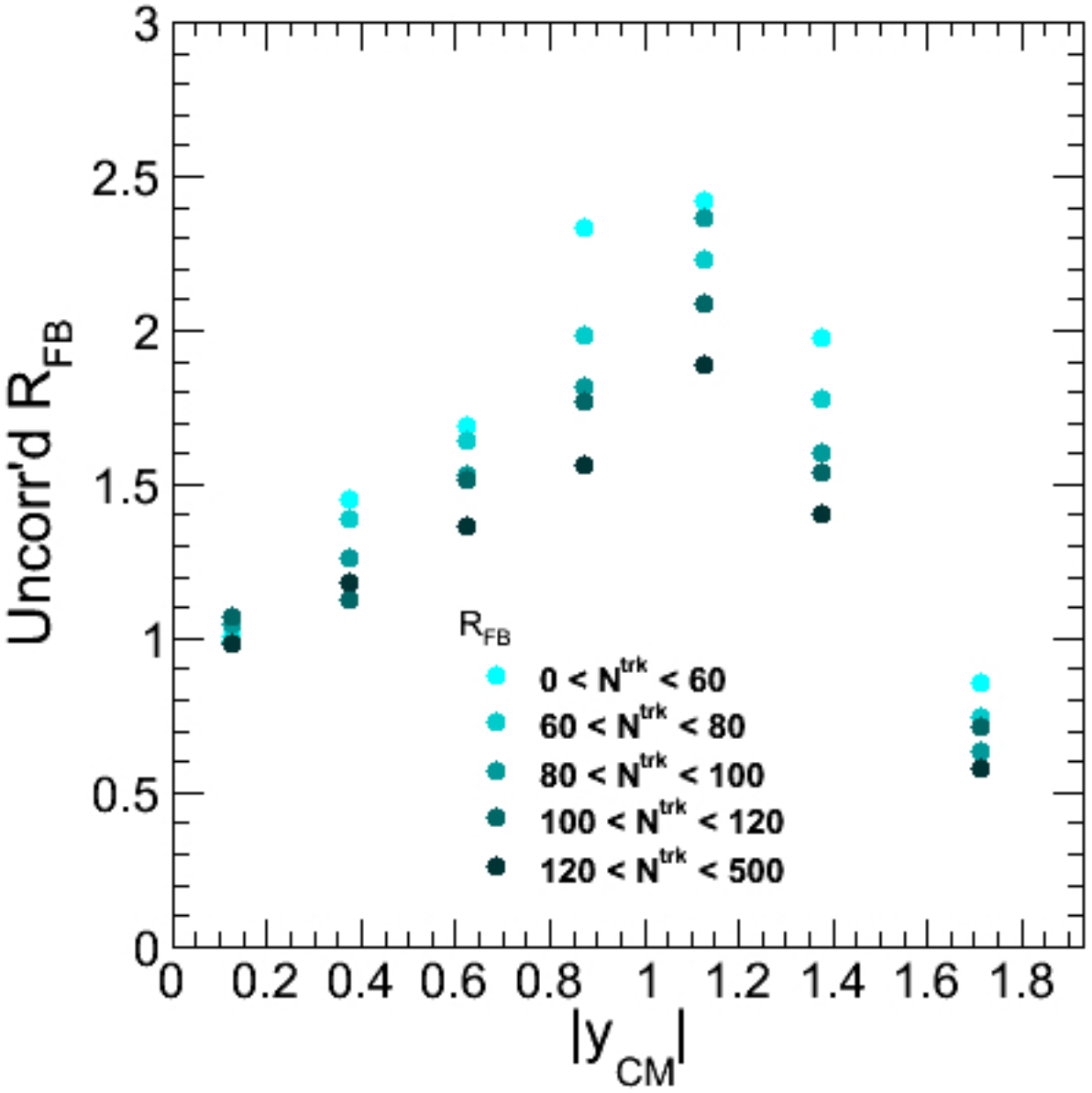
Rapidity dependence of yield



Each histograms is normalized by its area

Bigger asymmetry observed in the higher N^{trk} bin

R_{FB} VS N^{trk}



Individual curves are not meaningful because eff*Acc correction is not applied yet.

But, overall trend indicates that the R_FB will be smaller for high multiplicity events.

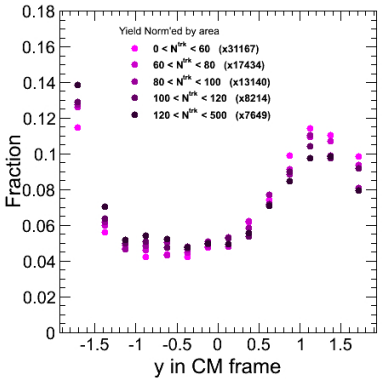
Double Ratio

Yield divided by (Ntrk < 60GeV value)

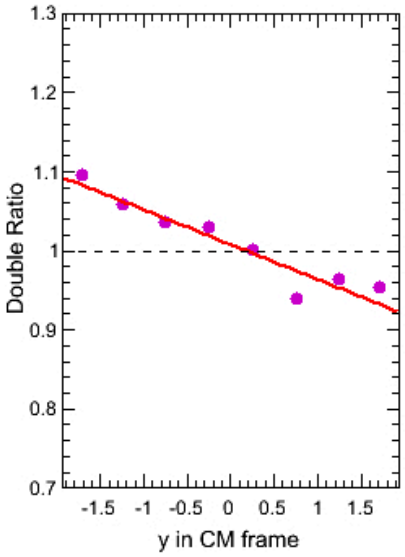
Eff and Acc are cancelled out for this double ratio value.

Linear Fit was tried to extract the slope of the modification.

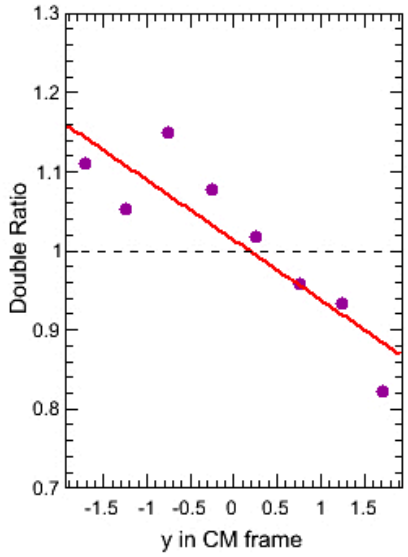
In the highest N^{trk} bin, R_FB differs by up to 20%.



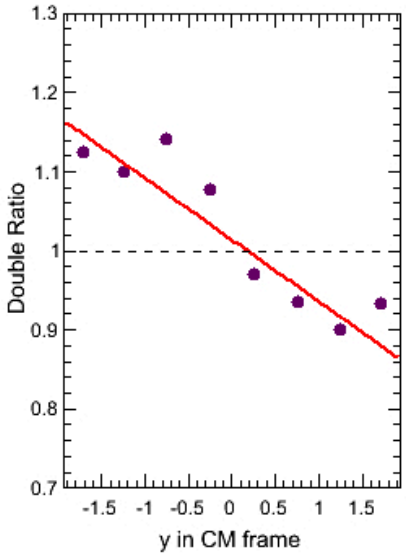
$\frac{60<Ntrk<80}{Ntrk<60}$



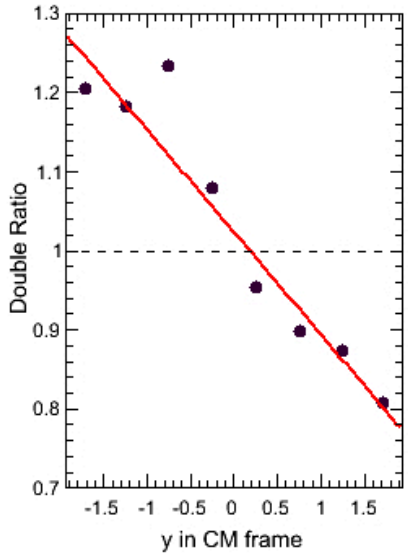
$\frac{80<Ntrk<100}{Ntrk<60}$



$\frac{100<Ntrk<120}{Ntrk<60}$



$\frac{Ntrk > 120}{Ntrk<60}$



Summary and Plan

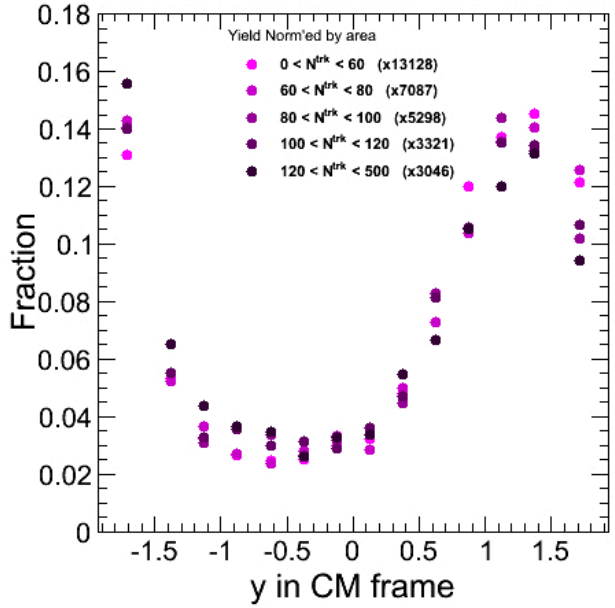
- Summary
  - N^{trk} dependence of J/psi R_FB was investigated.
  - Several corrections and fine tunings are missing but the results strongly indicates that R_FB curve is modified by the multiplicity

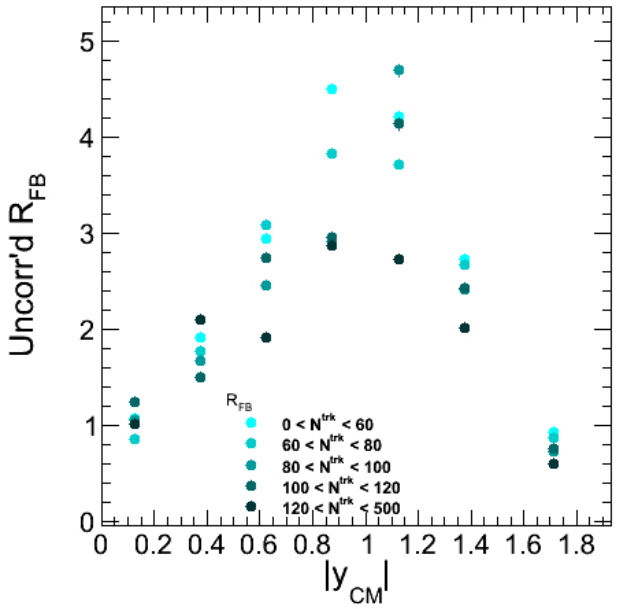
- Plan
  - Application of Acc and Eff correction
  - Separation of prompt and non-prompt J/psi using 2-d fitting (on-going)
  - Investigation of the bias by N^{trk} on the muon efficiency
  - Cross-check with HF energy binning

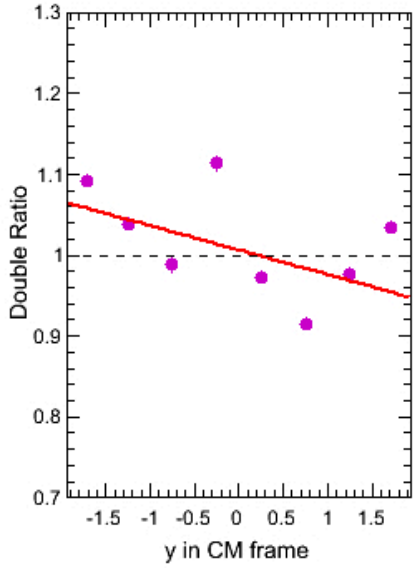
- (pT dependence study?)
  - Tried by dividing into 3 pT bins (6.5 – 8.5 – 11GeV – 30GeV) to investigate the pT dependence.
  - Could not find a clear pT dependence yet. (See Backup slides)

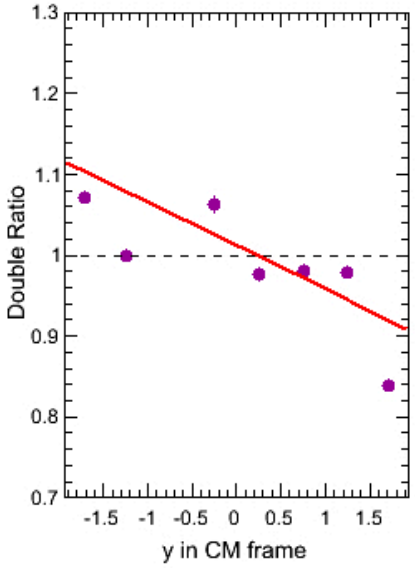
BACKUP

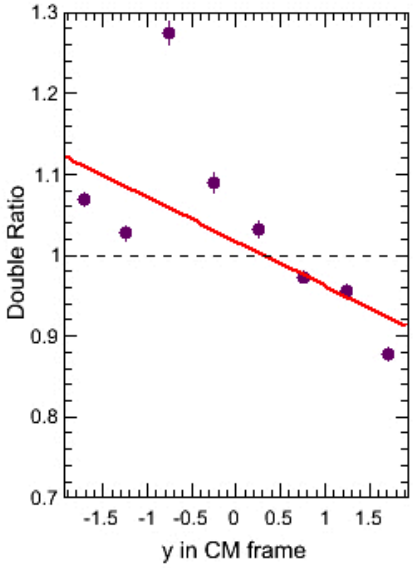
Low pT : pT 6.5 – 8.5 GeV

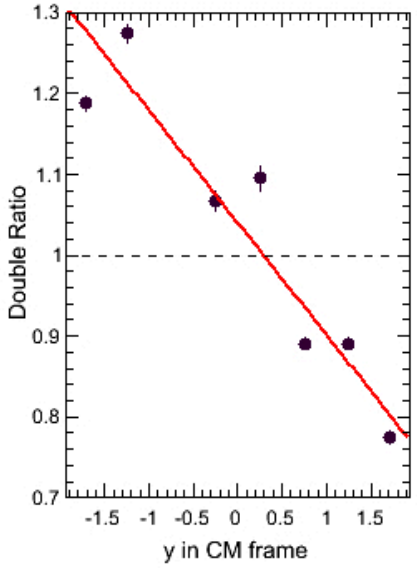




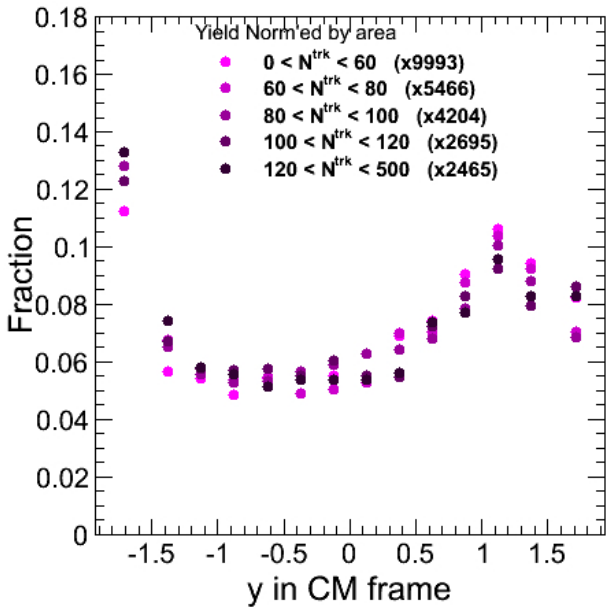


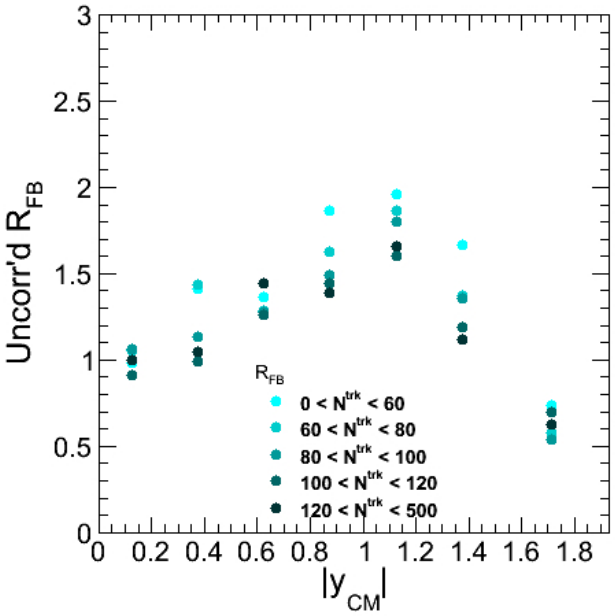


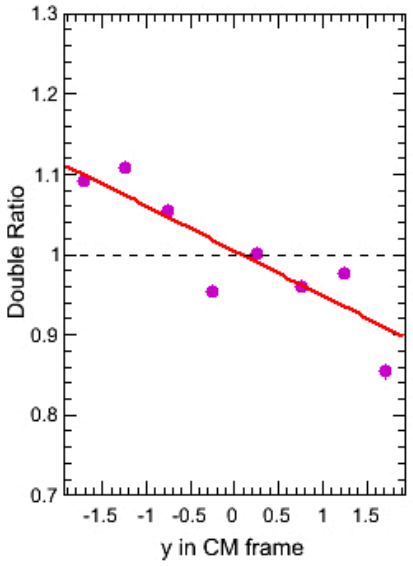


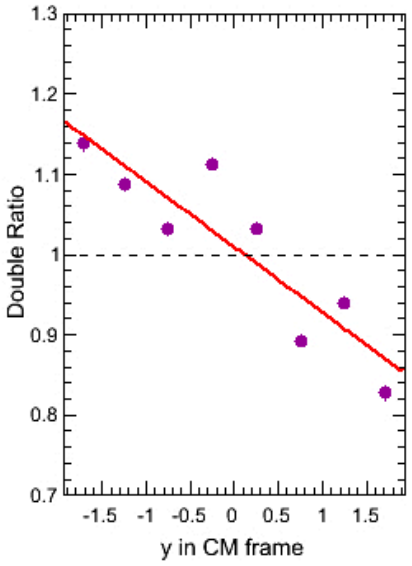


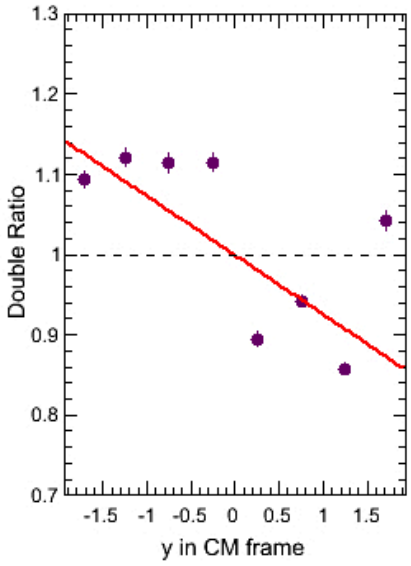
Mid pT : pT 8.5 – 11 GeV

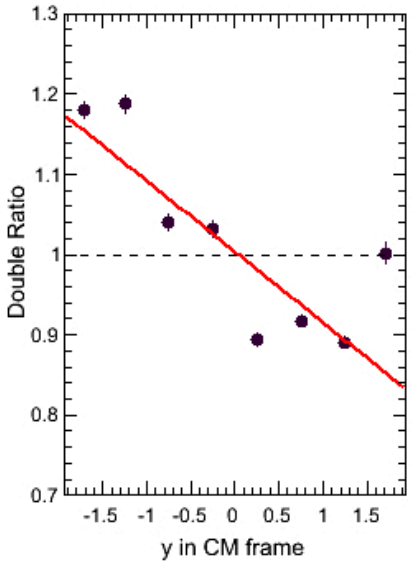




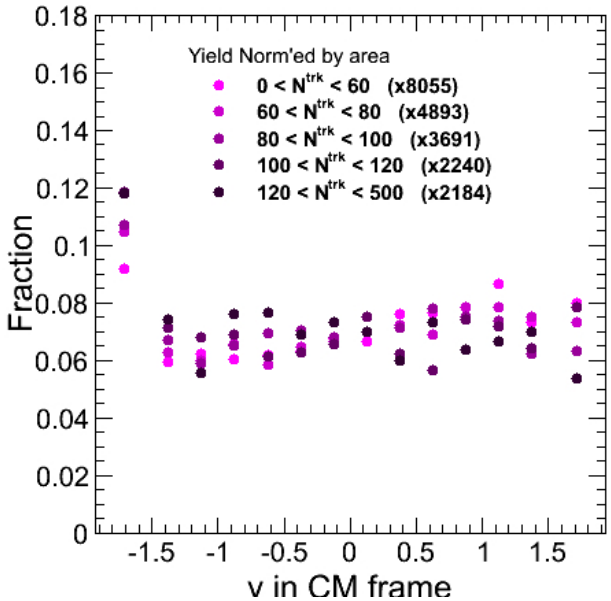


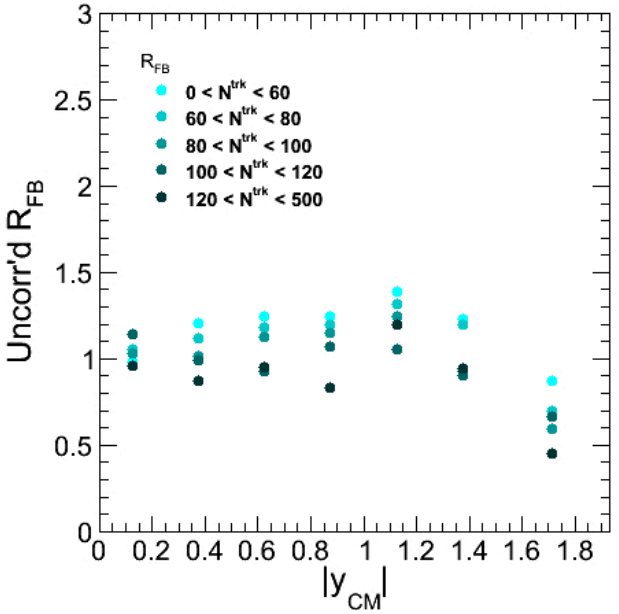


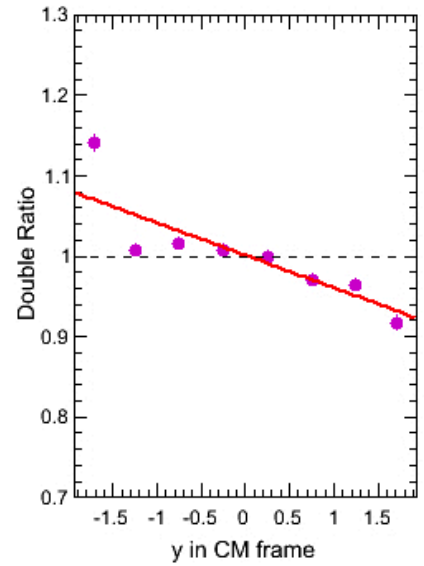


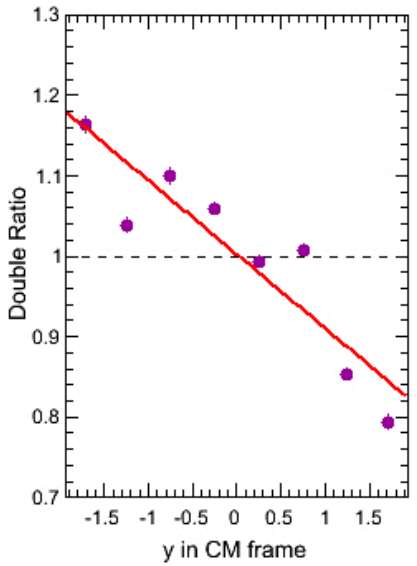


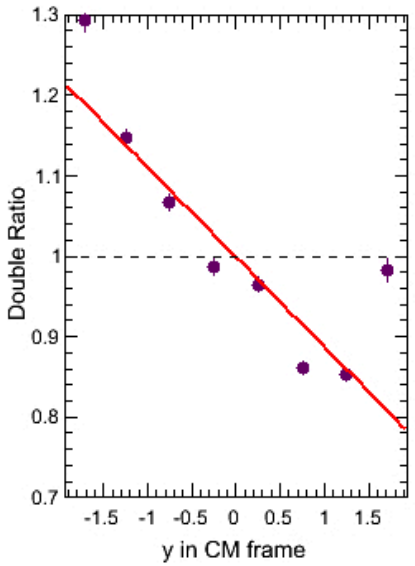
High pT : 11GeV – 30GeV

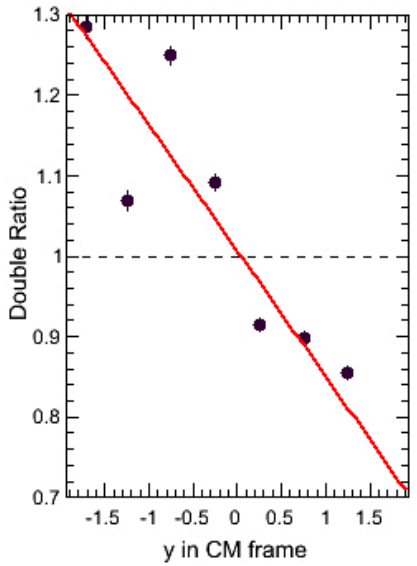


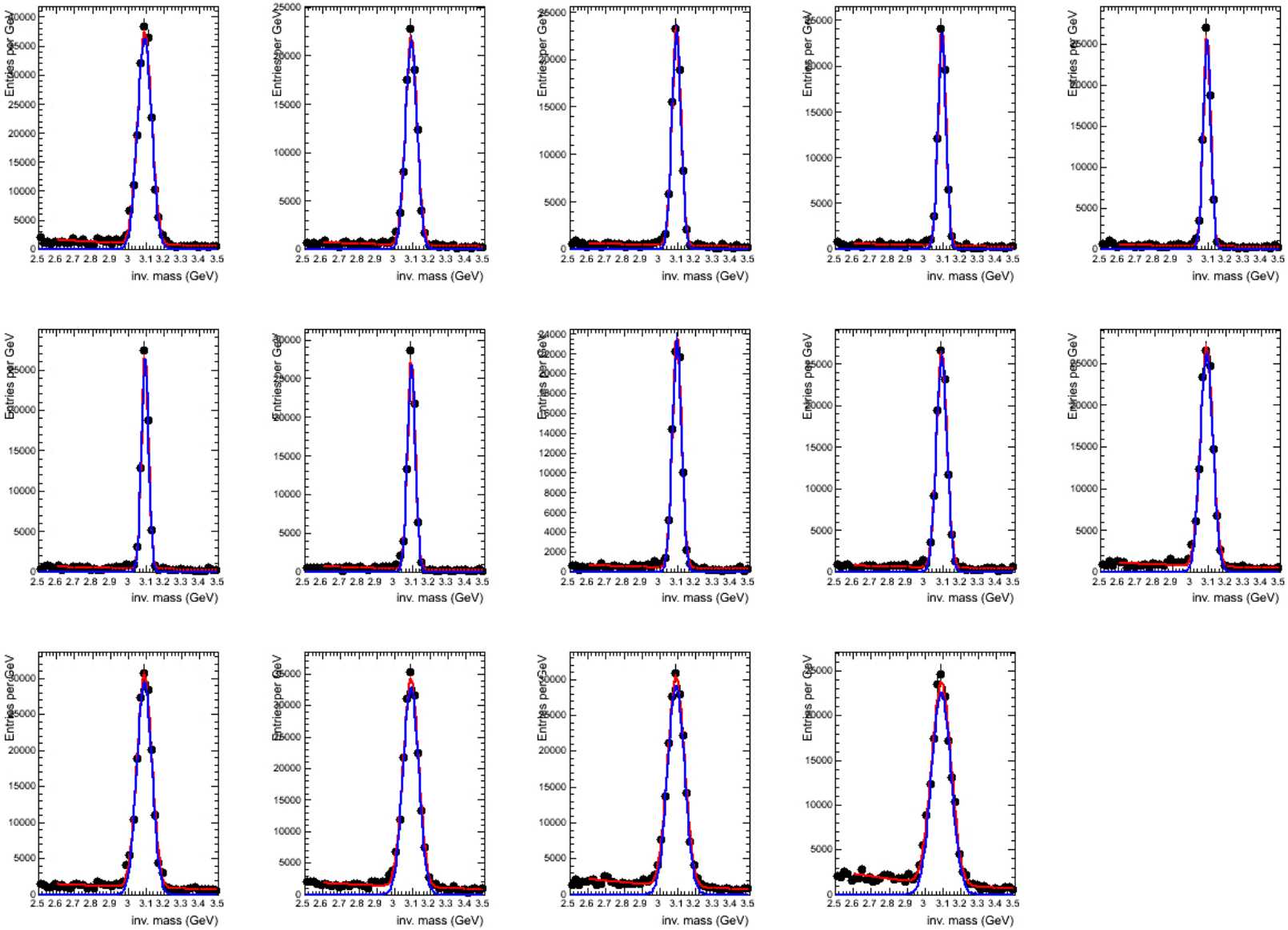


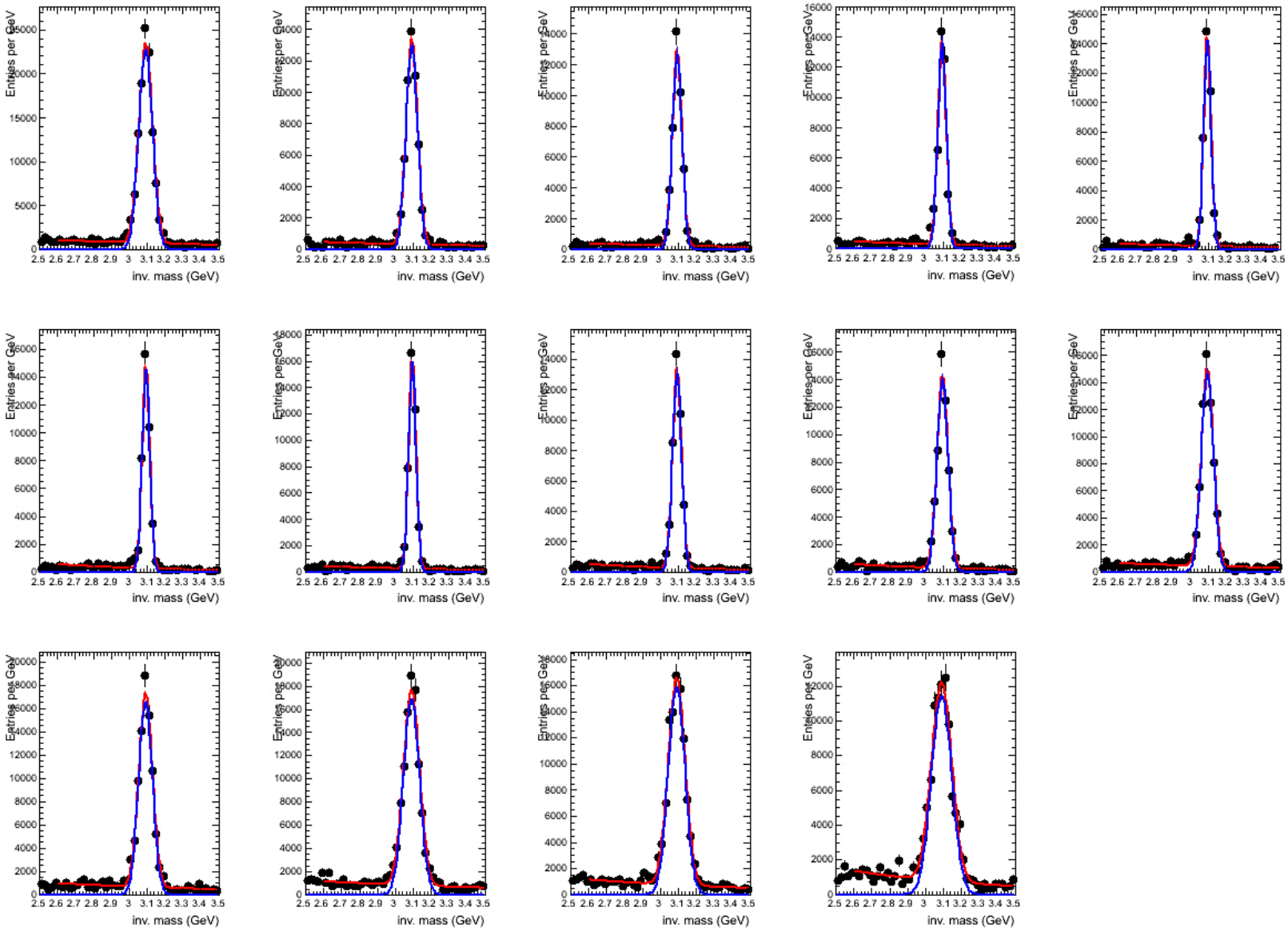


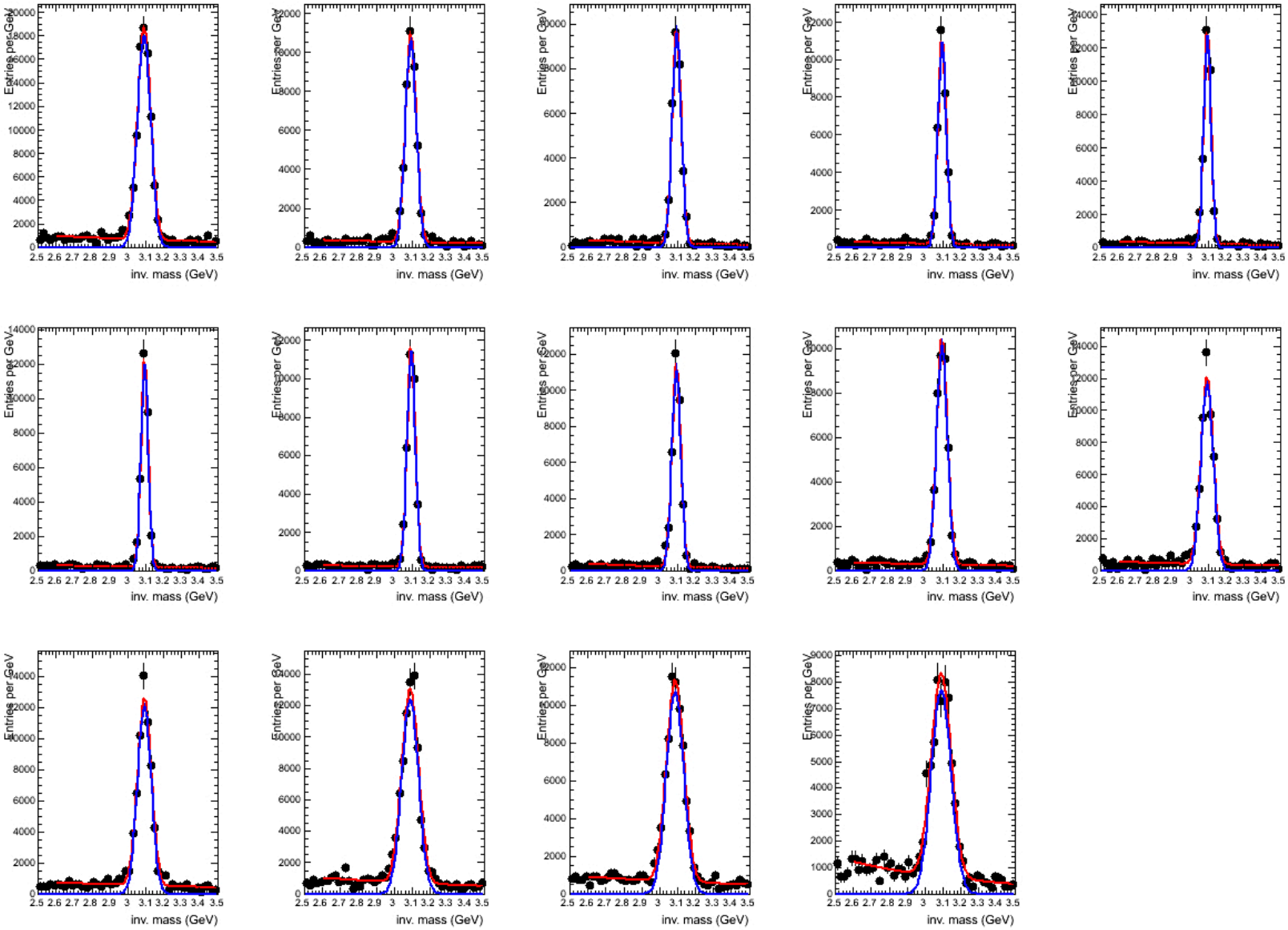







Entries per GeV
inv. mass (GeV)


Entries per GeV
inv. mass (GeV)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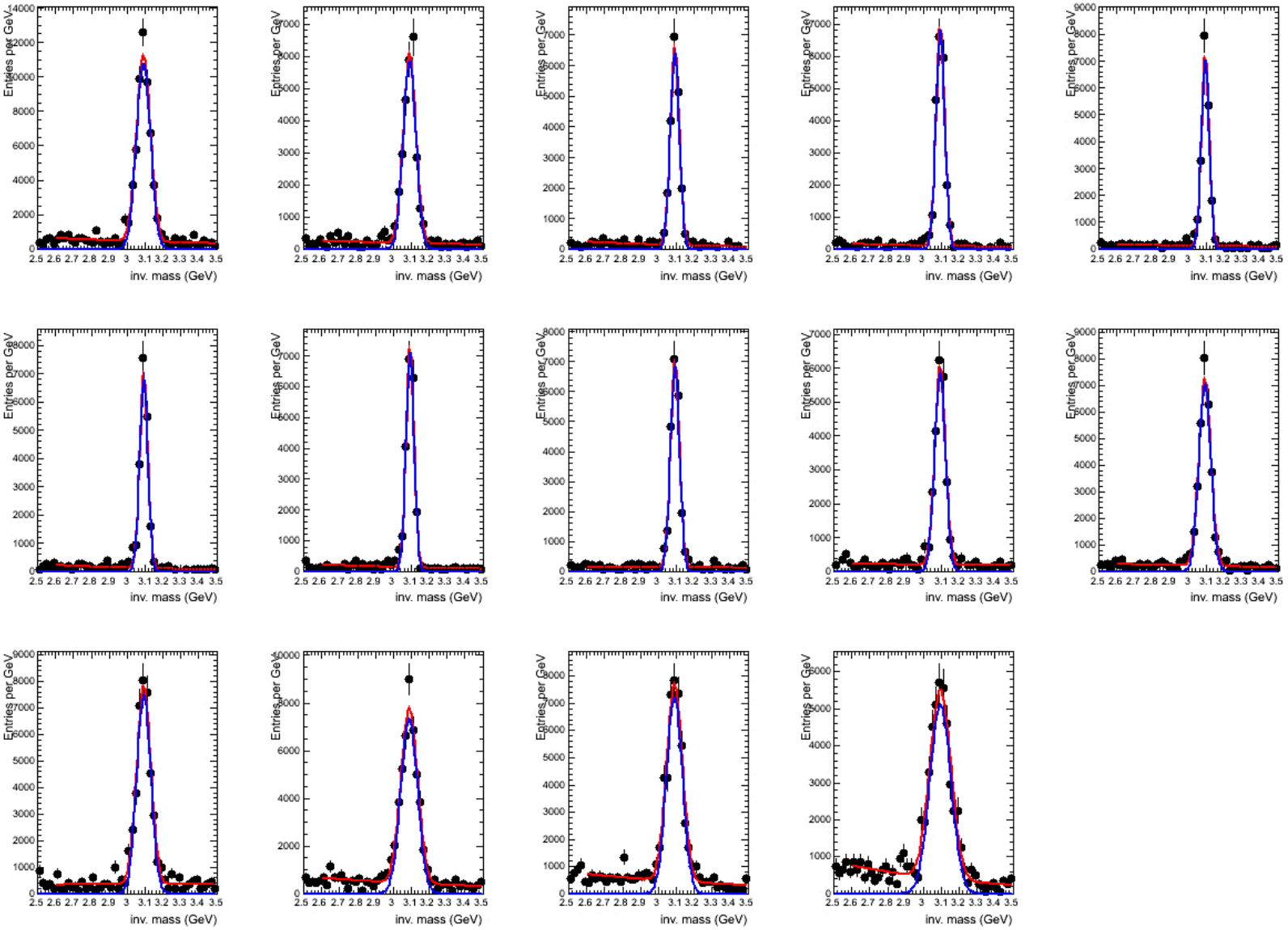
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