Efficiency Comparisons

Manuel Calderón de la Barca Sánchez

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BROOKHAVEN
NATIONAL LABORATORY

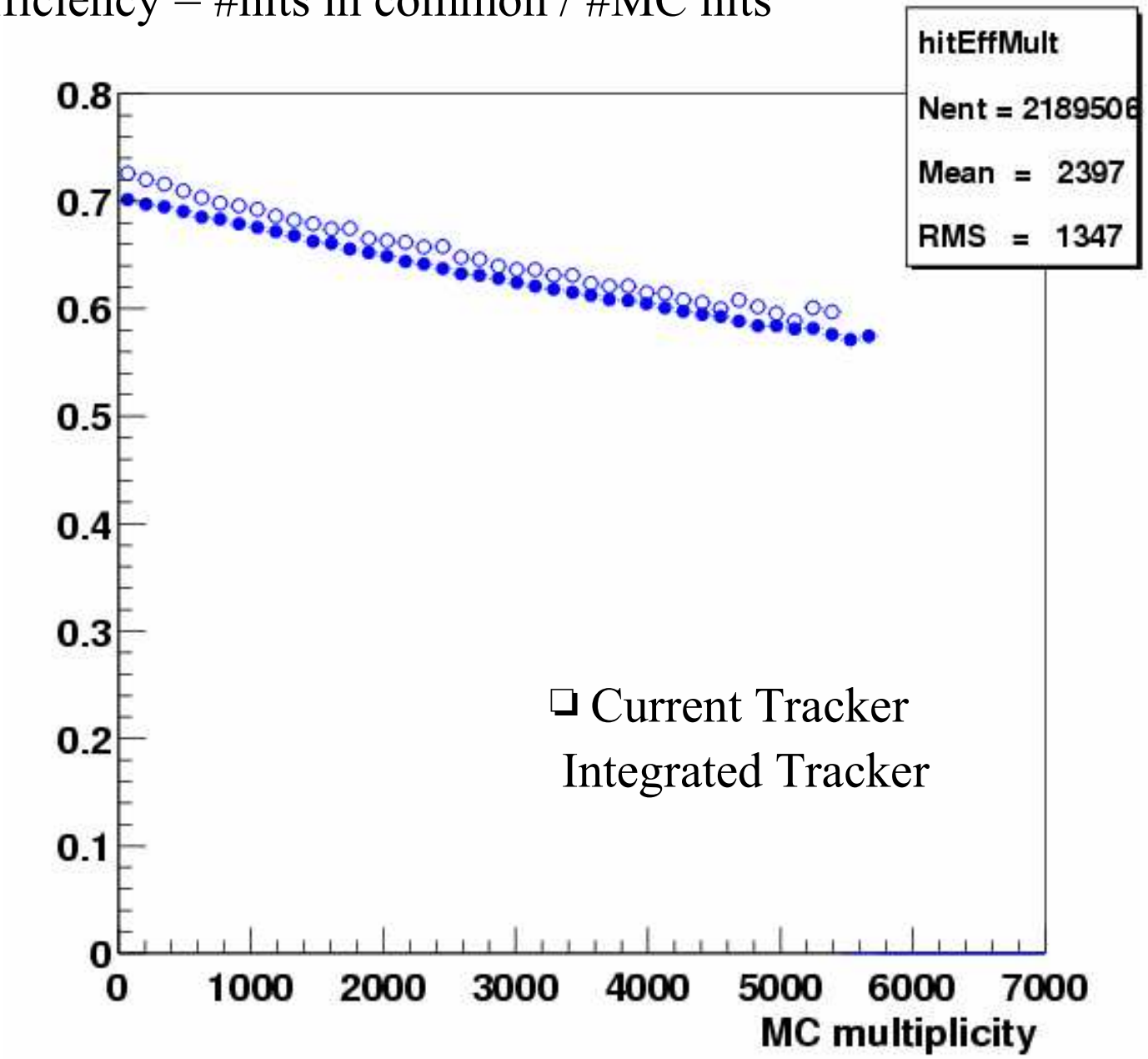
Hit and Tracking

- **Data set used: Hijing MinBias simulations**
  - **Usually, absolute value of efficiency is too ideal**
  - **… comparisons between current code & IT**

- **Approach**
  - **First look at bulk with loose cuts…**
    - *All multiplicities, fit Points > 9, |eta|<1.5, no dca cut (3 cm implicit for primaries), look only at pi+*
  - **Then look in finer detail with realistic cuts**
    - *3 multiplicity bins, fit Points>23, |eta|<.5, dca<1.5*

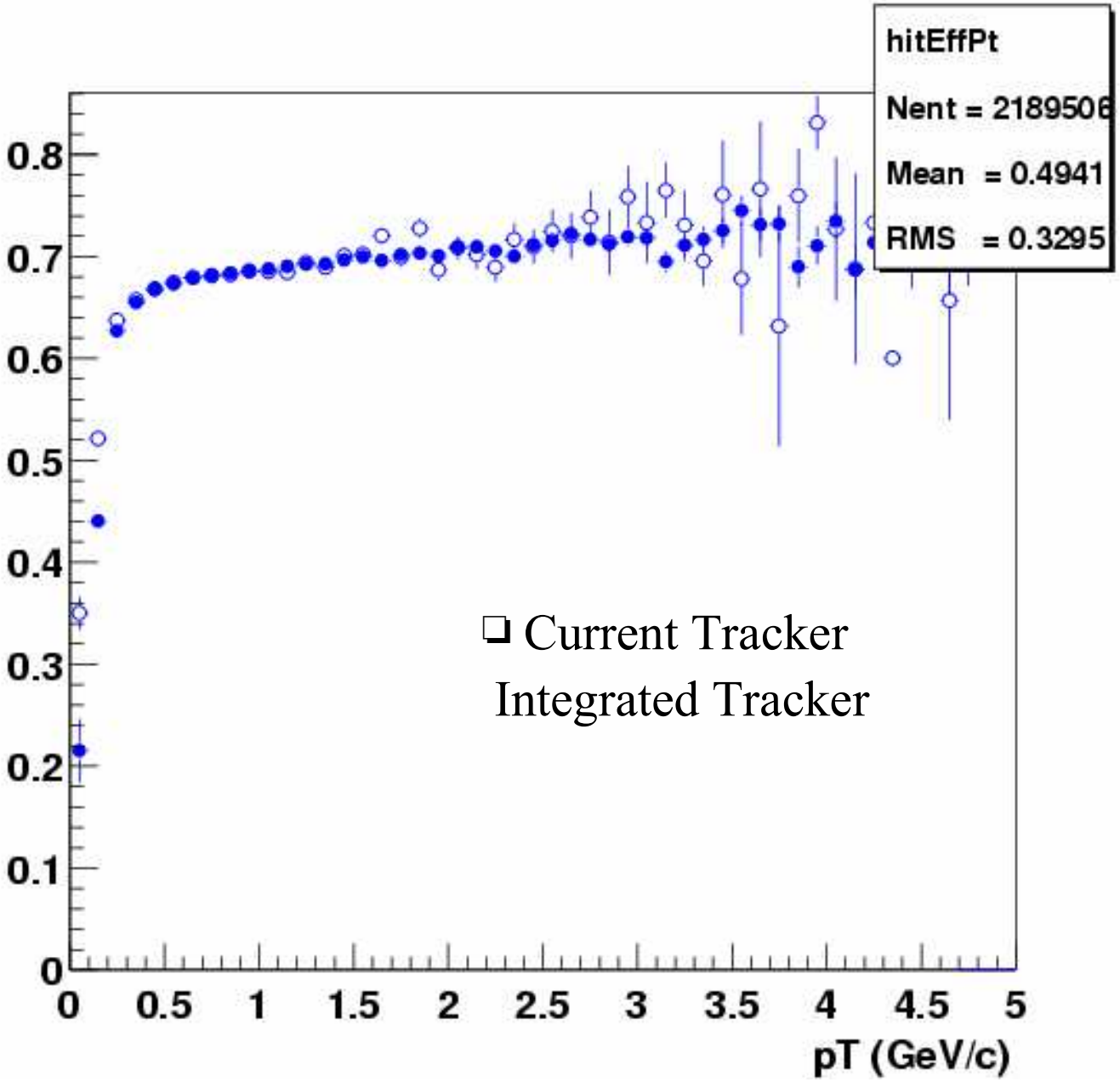
Hit Efficiency vs Multiplicity

Hit Efficiency = #hits in common / #MC hits



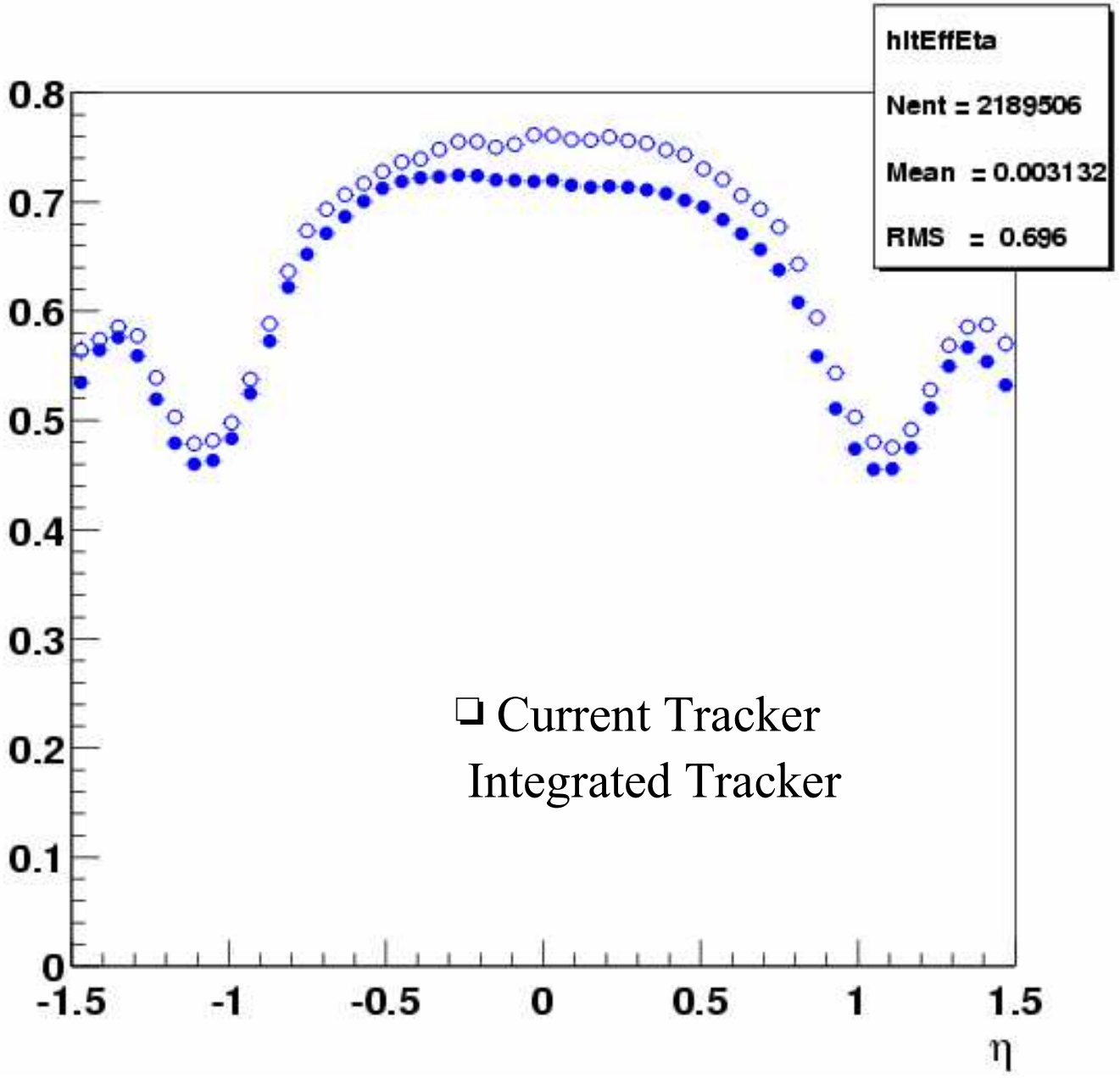
- Current Tracker
  Integrated Tracker

Hit Efficiency vs pT



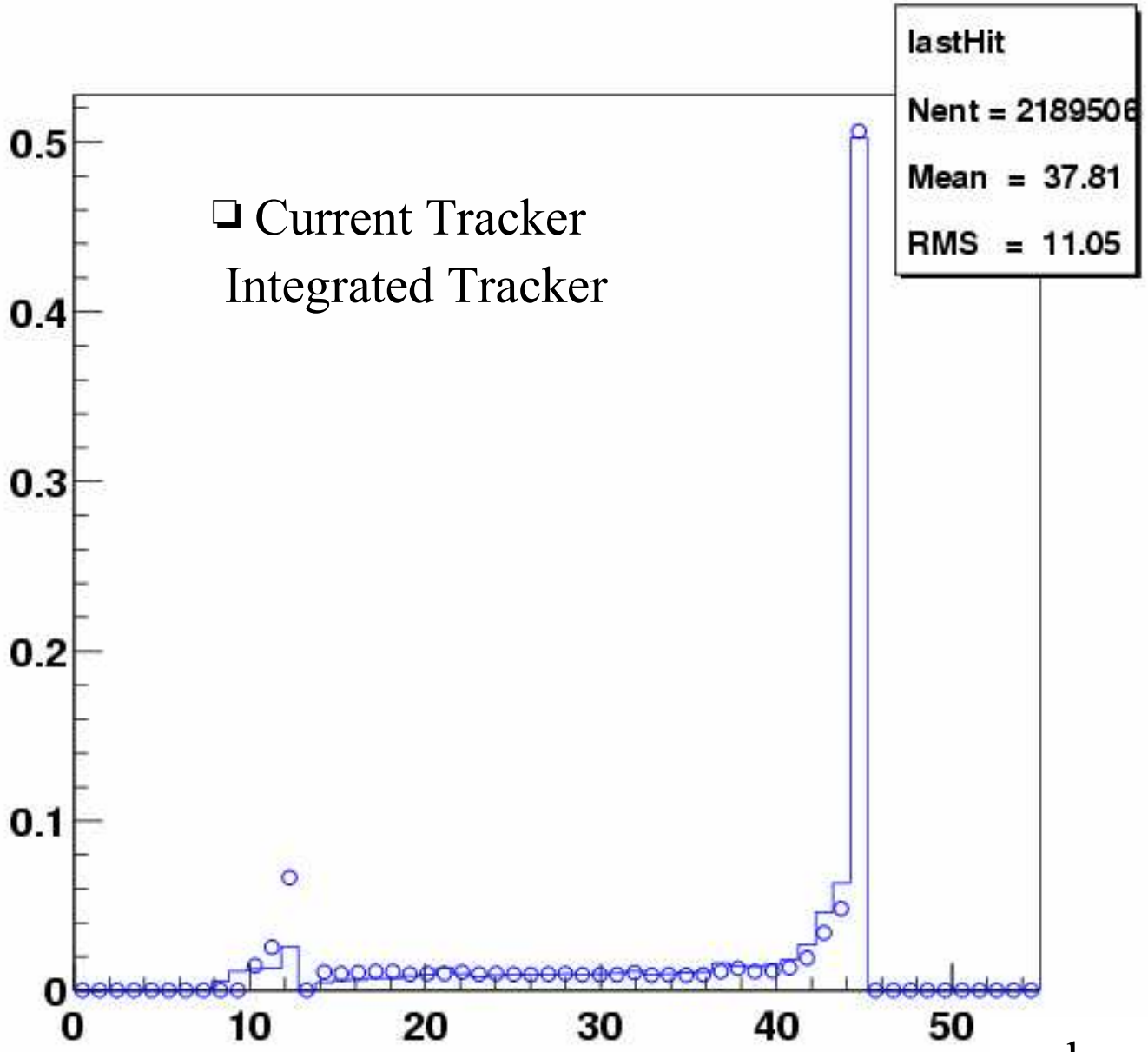
- Current Tracker
  Integrated Tracker

Hit Efficiency vs Eta



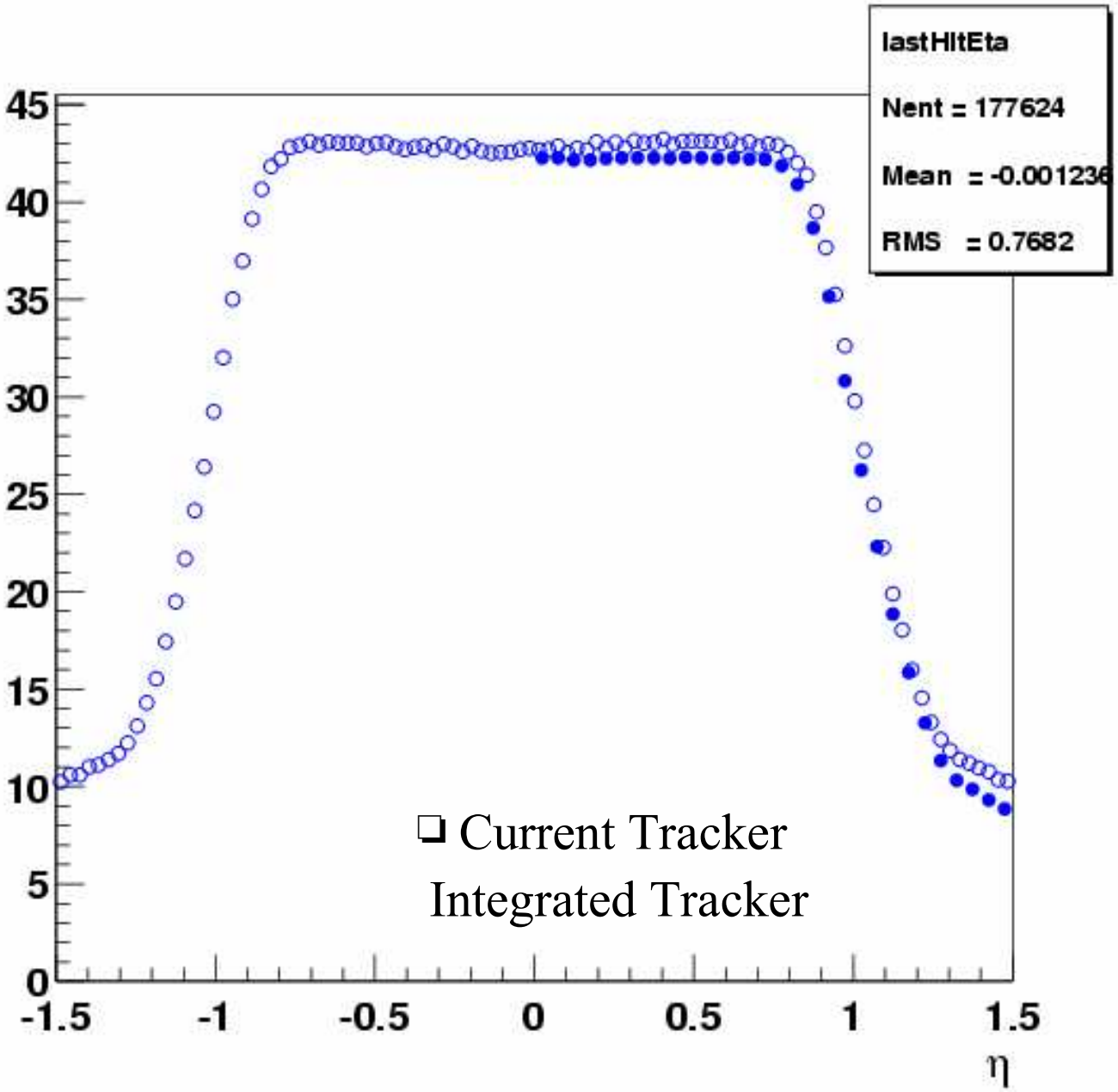
- Current Tracker
  Integrated Tracker

Padrow of Last Hit



- Current Tracker
  Integrated Tracker

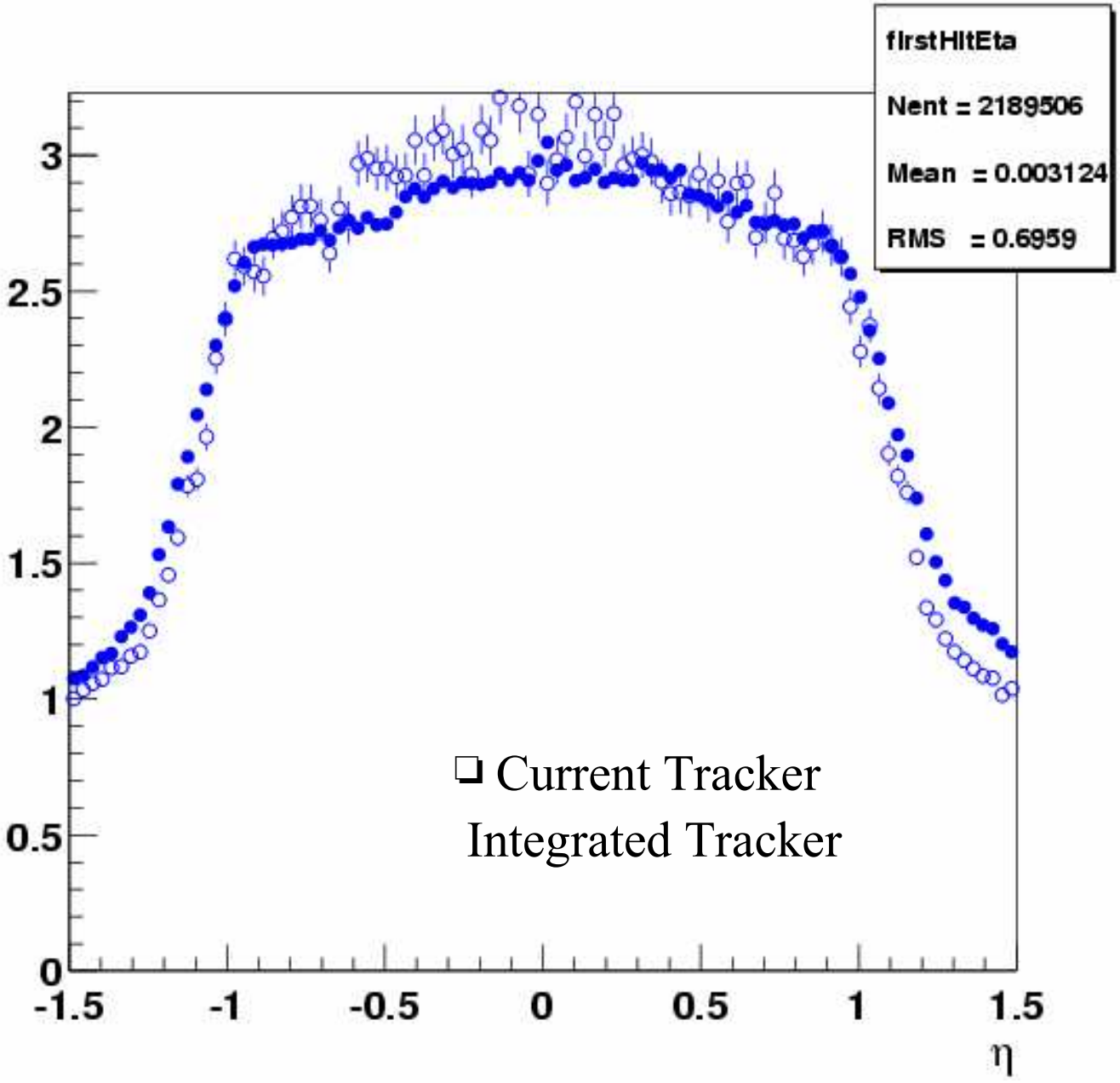
Padrow of Last Hit vs eta



- Current Tracker

Integrated Tracker

Padrow of First Hit vs Eta



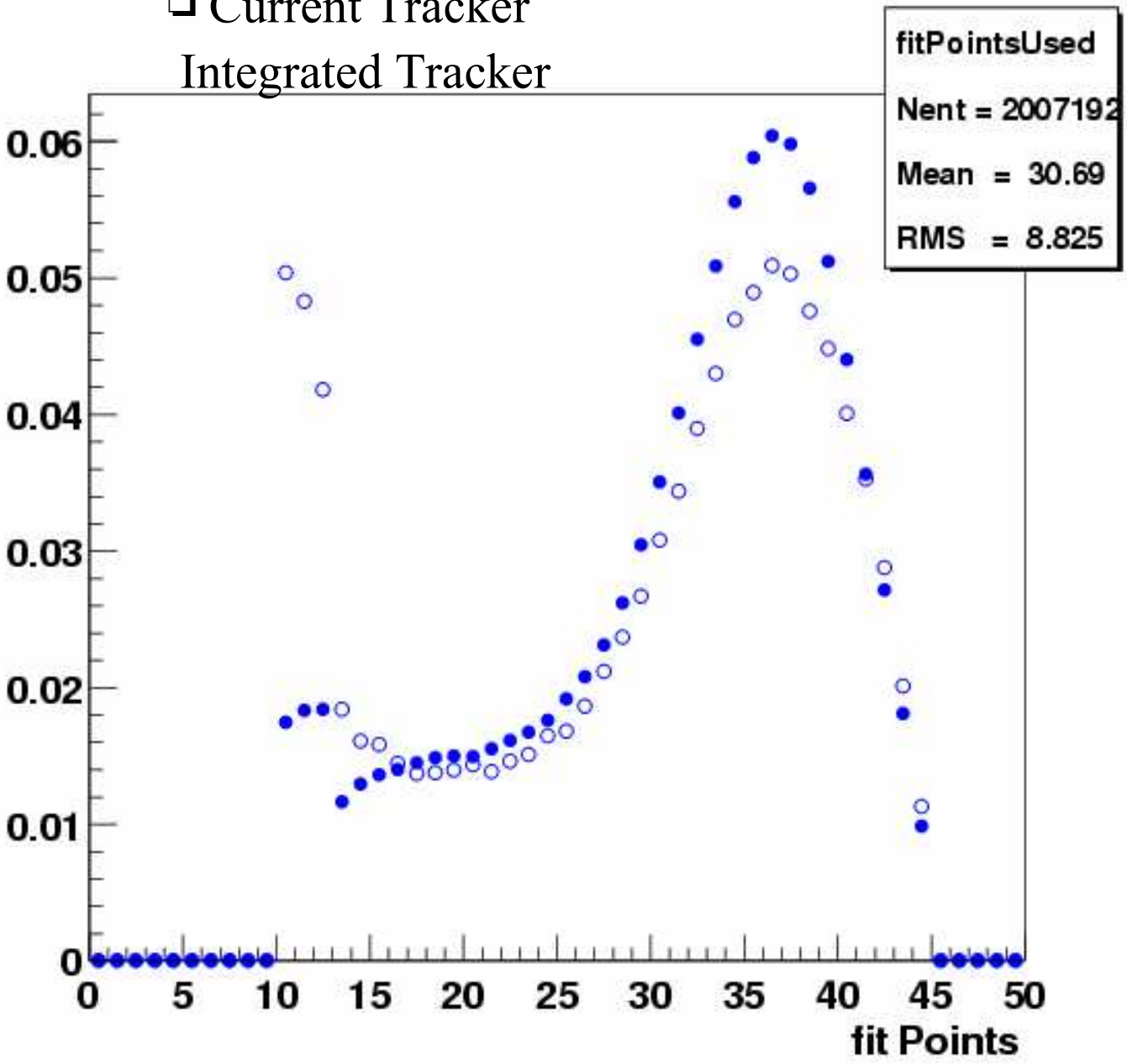
- Current Tracker

Integrated Tracker

Fit Points I

Loose cuts:
All mult,
|eta|<1.5,
dca<3,
Fit Pts>9

- Current Tracker
  Integrated Tracker



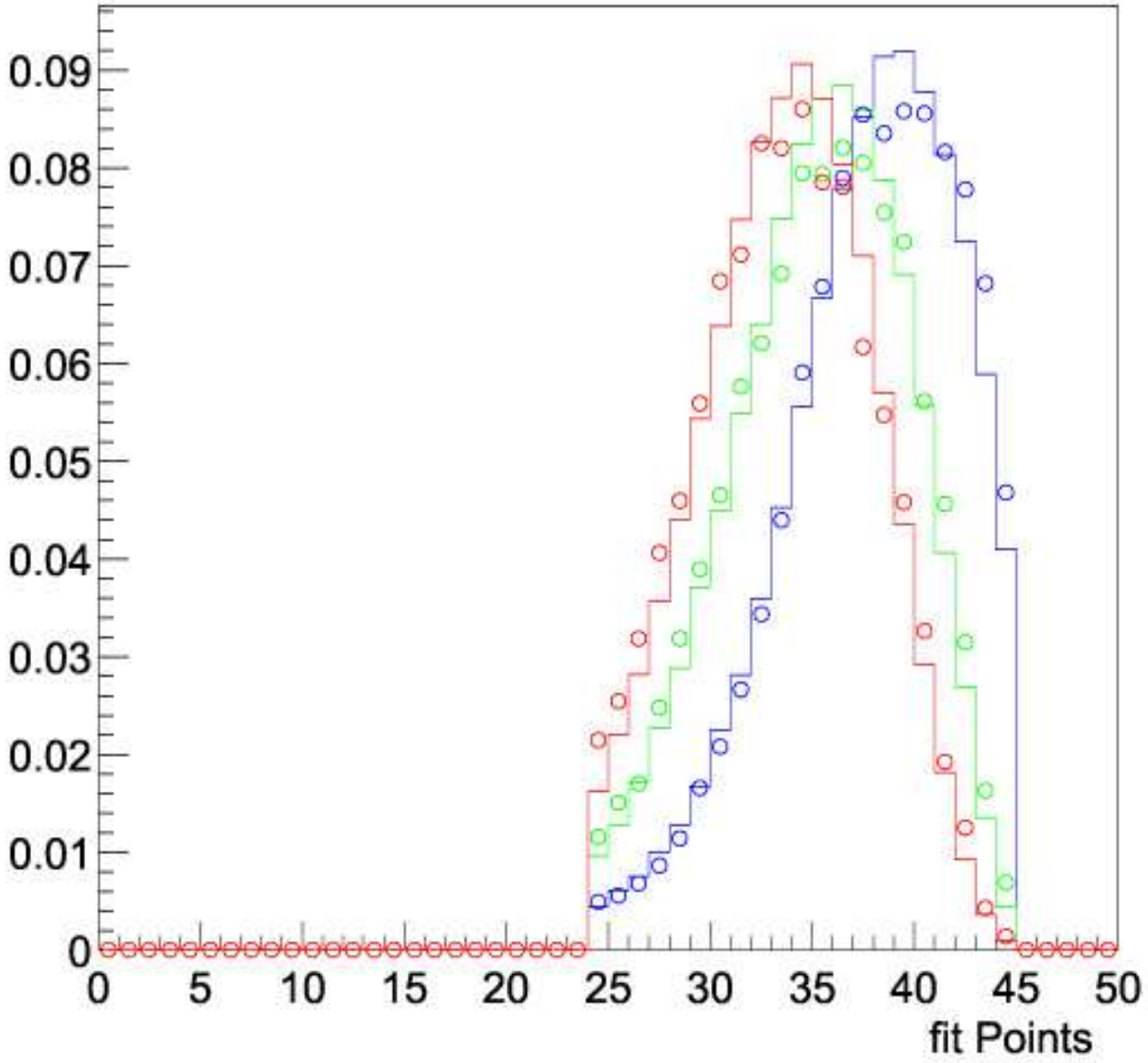
Fit Points II

Low, Medium, High Multiplicity

❑ Current Tracker
Integrated Tracker

Tight cuts:
Fit Points>23
Dca<1.5,
|eta|<0.5

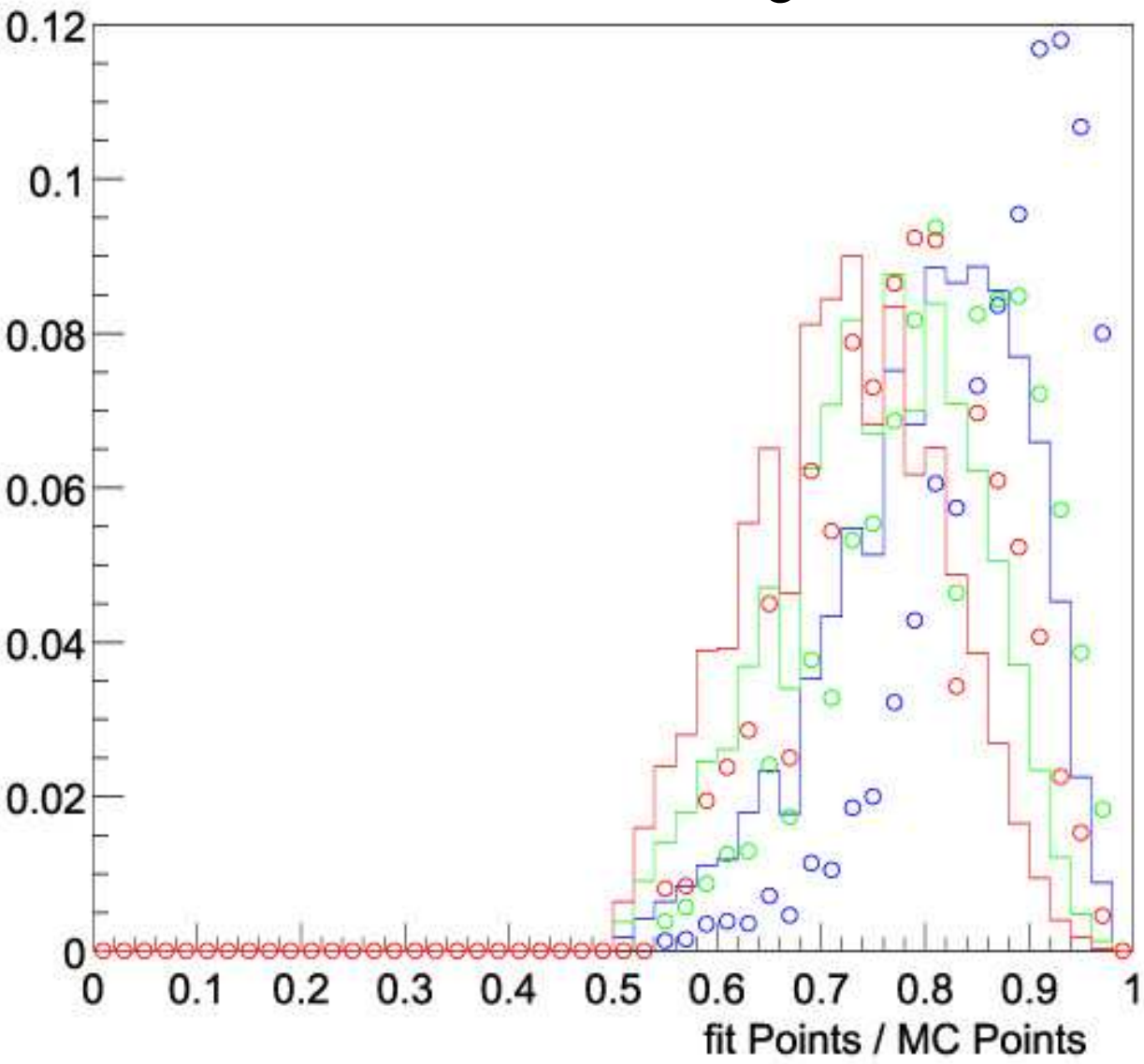
Normalized
To 1



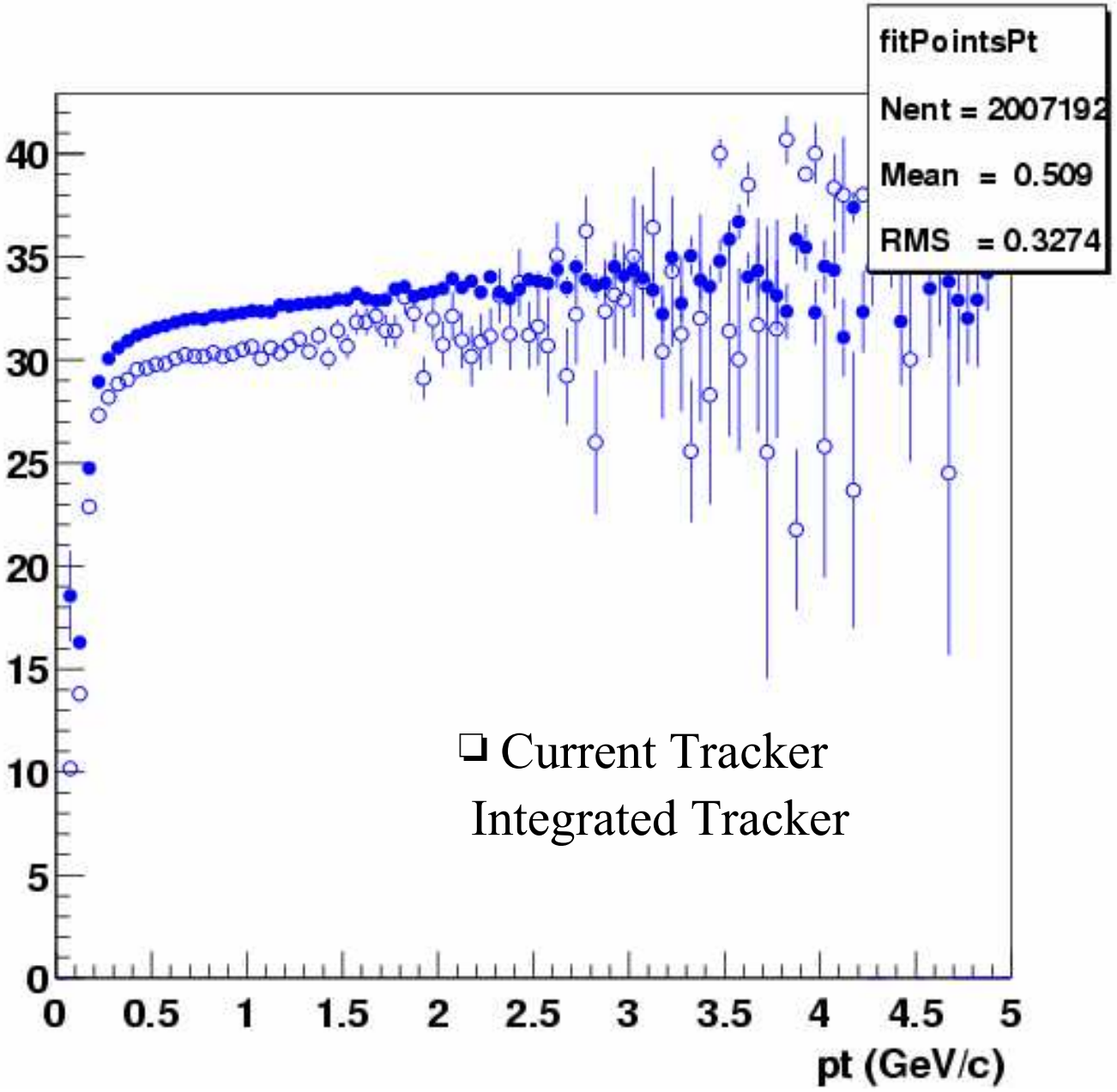
Fit Point "Efficiency": Fit Points/MC Hits

Low, Medium, High Multiplicity

- Current Tracker
- Integrated Tracker



Mean Fit Points vs pT I

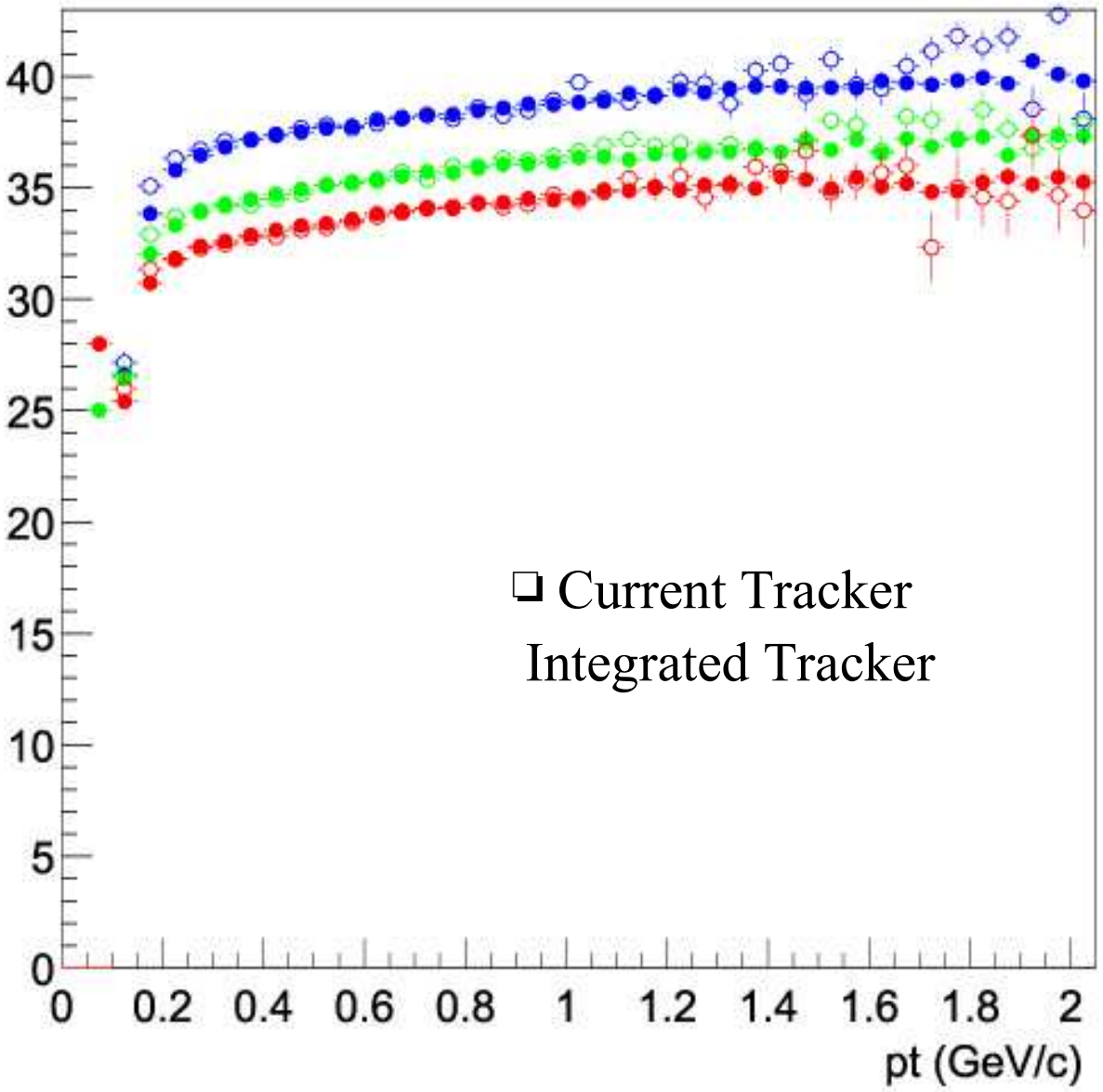


- Current Tracker

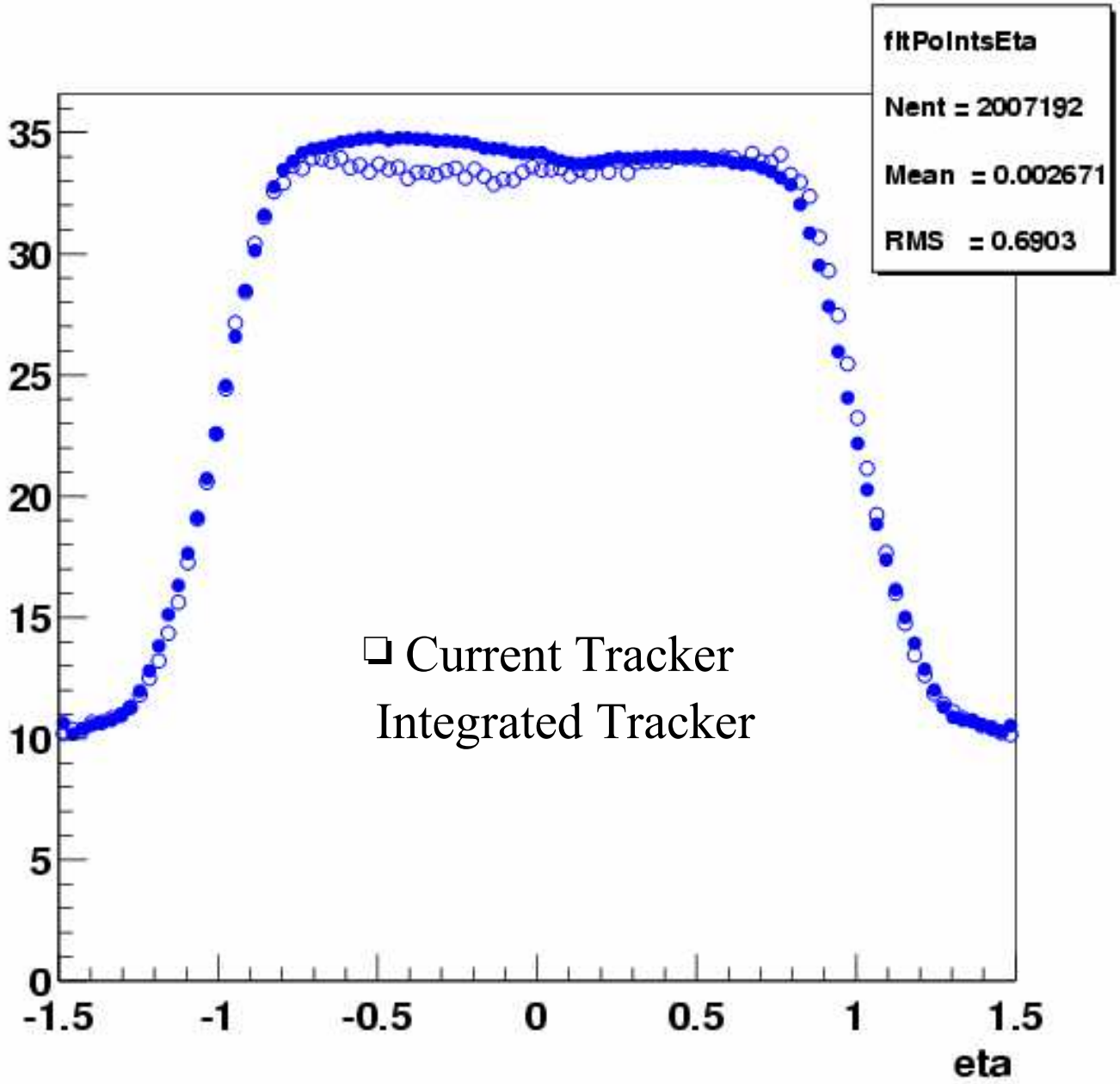
Integrated Tracker

Mean Fit Points vs pT II

Low, Medium, High Multiplicity



Mean Fit Points vs Eta I

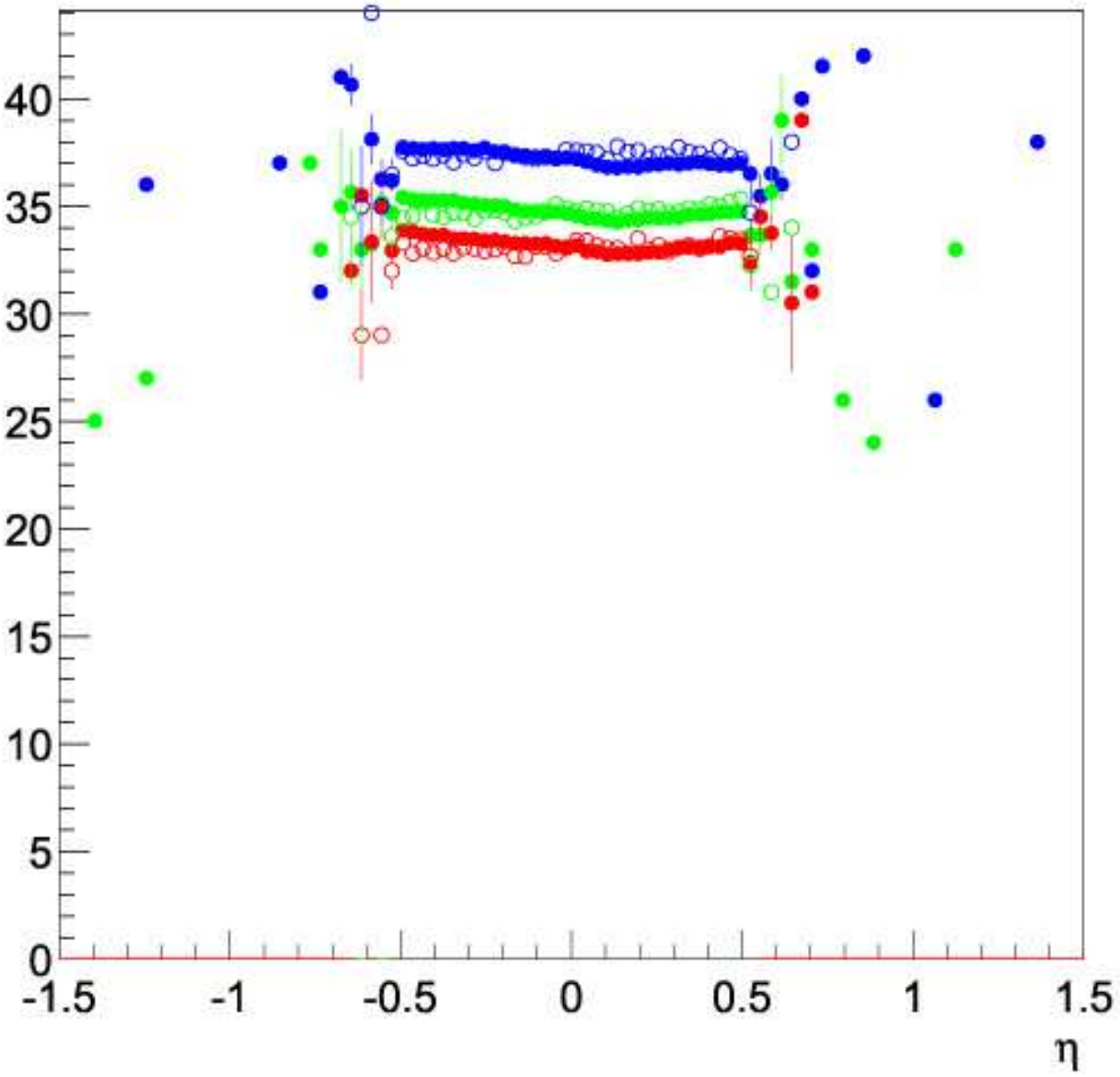


- Current Tracker
  Integrated Tracker

Mean Fit Points vs eta II

Low, Medium, High Multiplicity

- Current Tracker
- Integrated Tracker



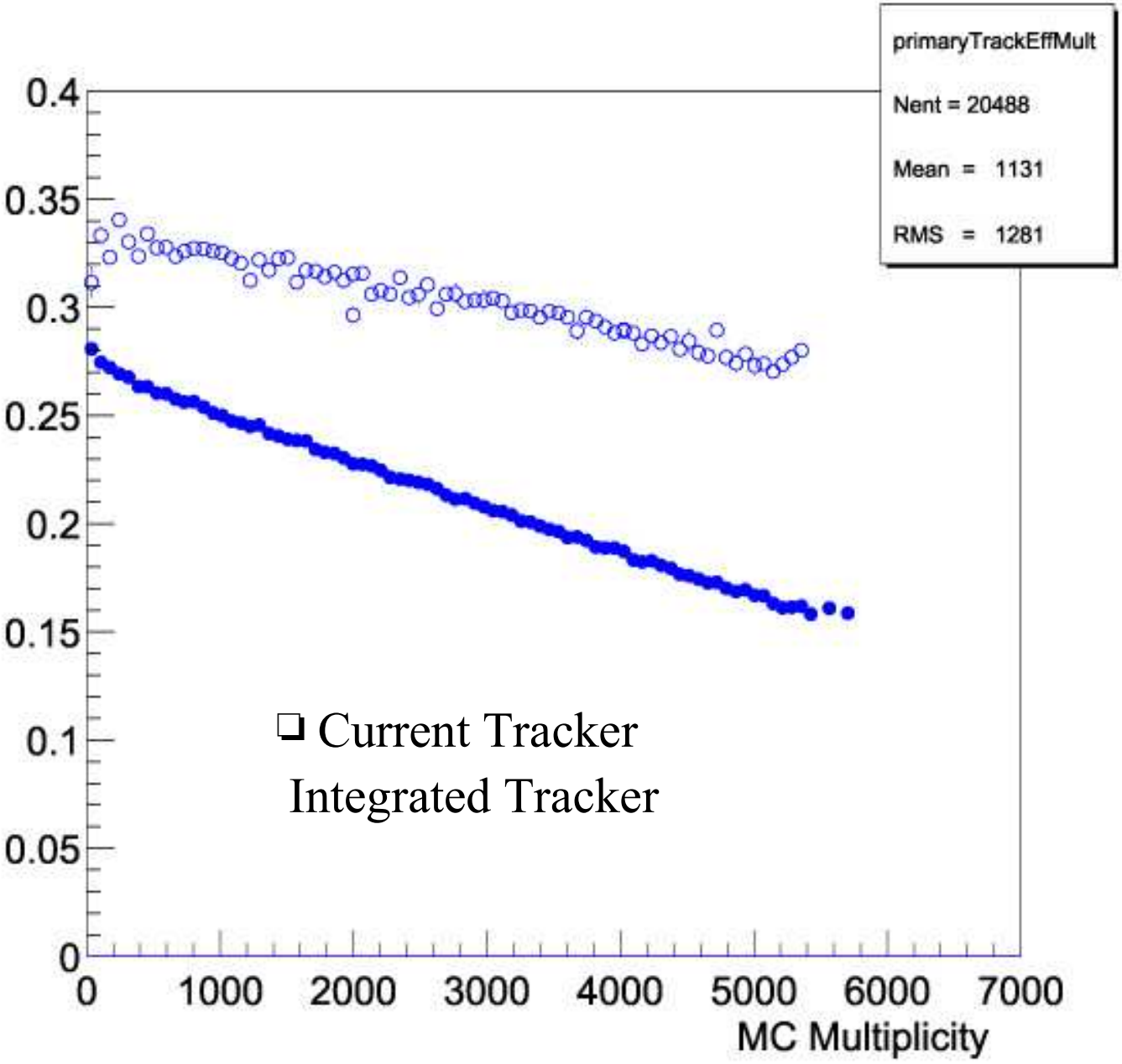
"Efficiency" vs Multiplicity

Here, efficiency is:

<u>All Matched Tracks</u>
All MC Tracks

(even MC tracks
Not in acceptance)

So, absolute scale
Much worse than
True efficiency.

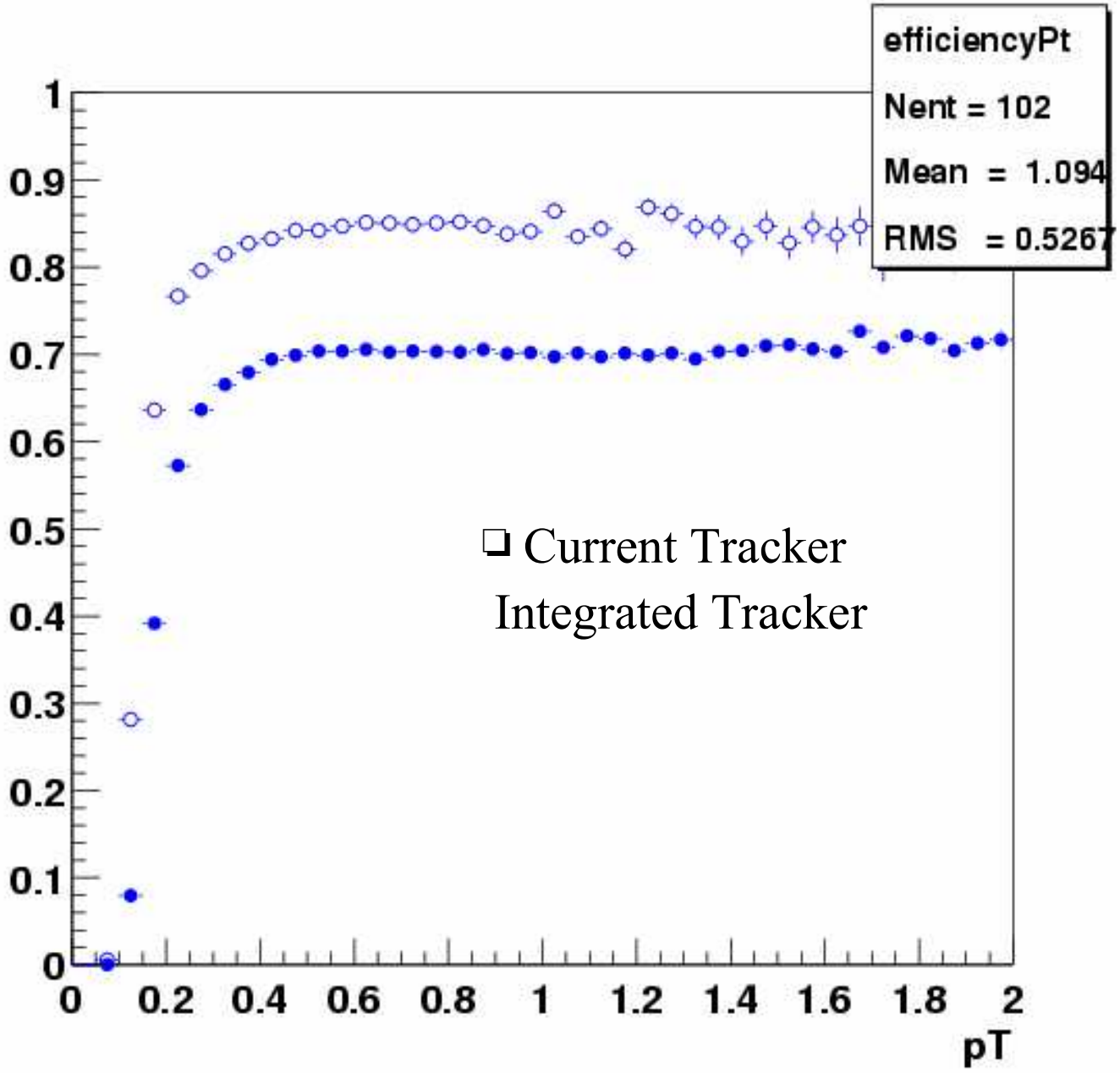


Efficiency vs pT I

Here, efficiency is:

Found & Matched
MC Accepted

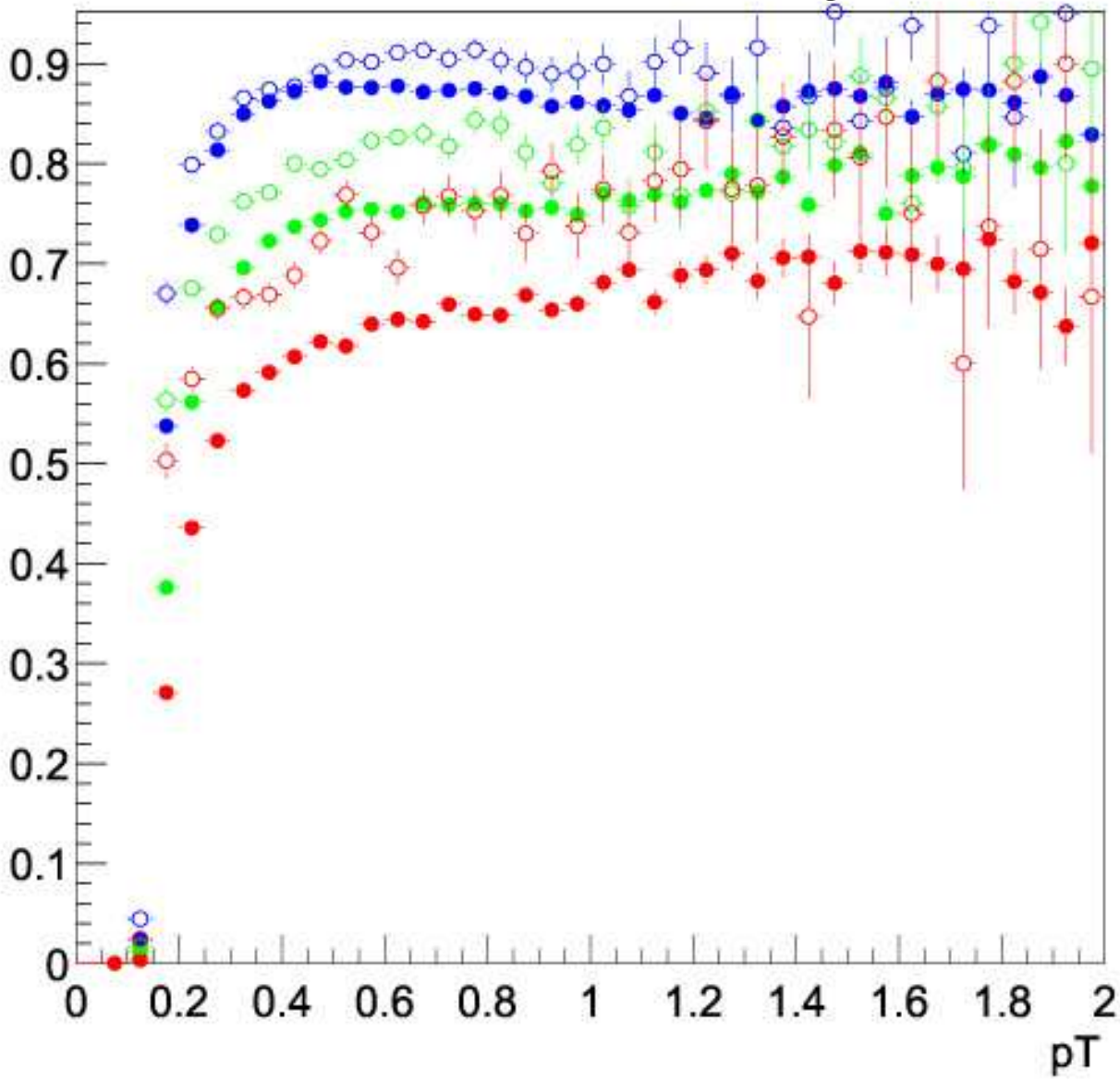
i.e. as in all spectra analyses



Efficiency vs pT II

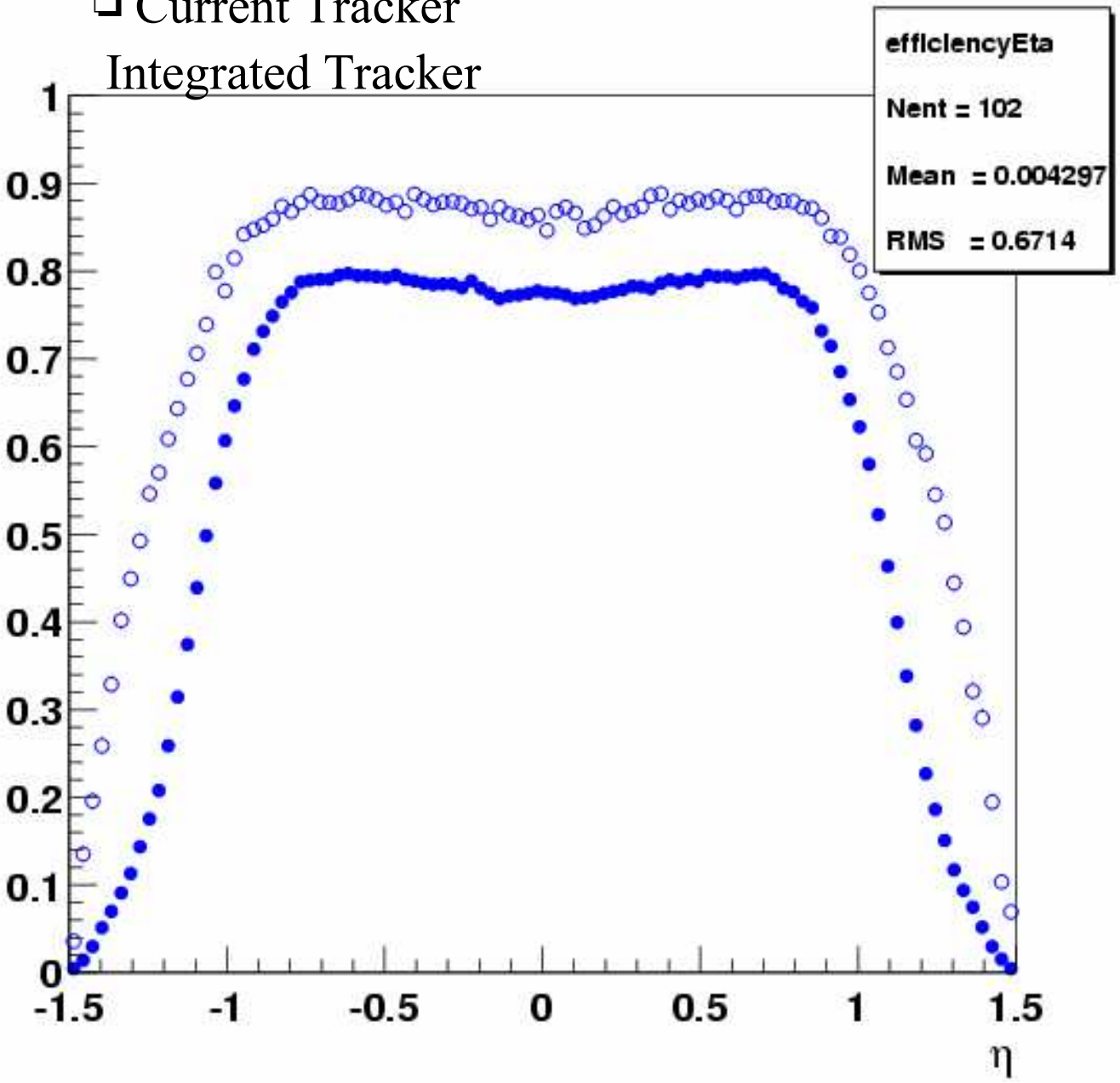
Low, Medium, High Multiplicity

- Current Tracker
- Integrated Tracker



Efficiency vs eta I

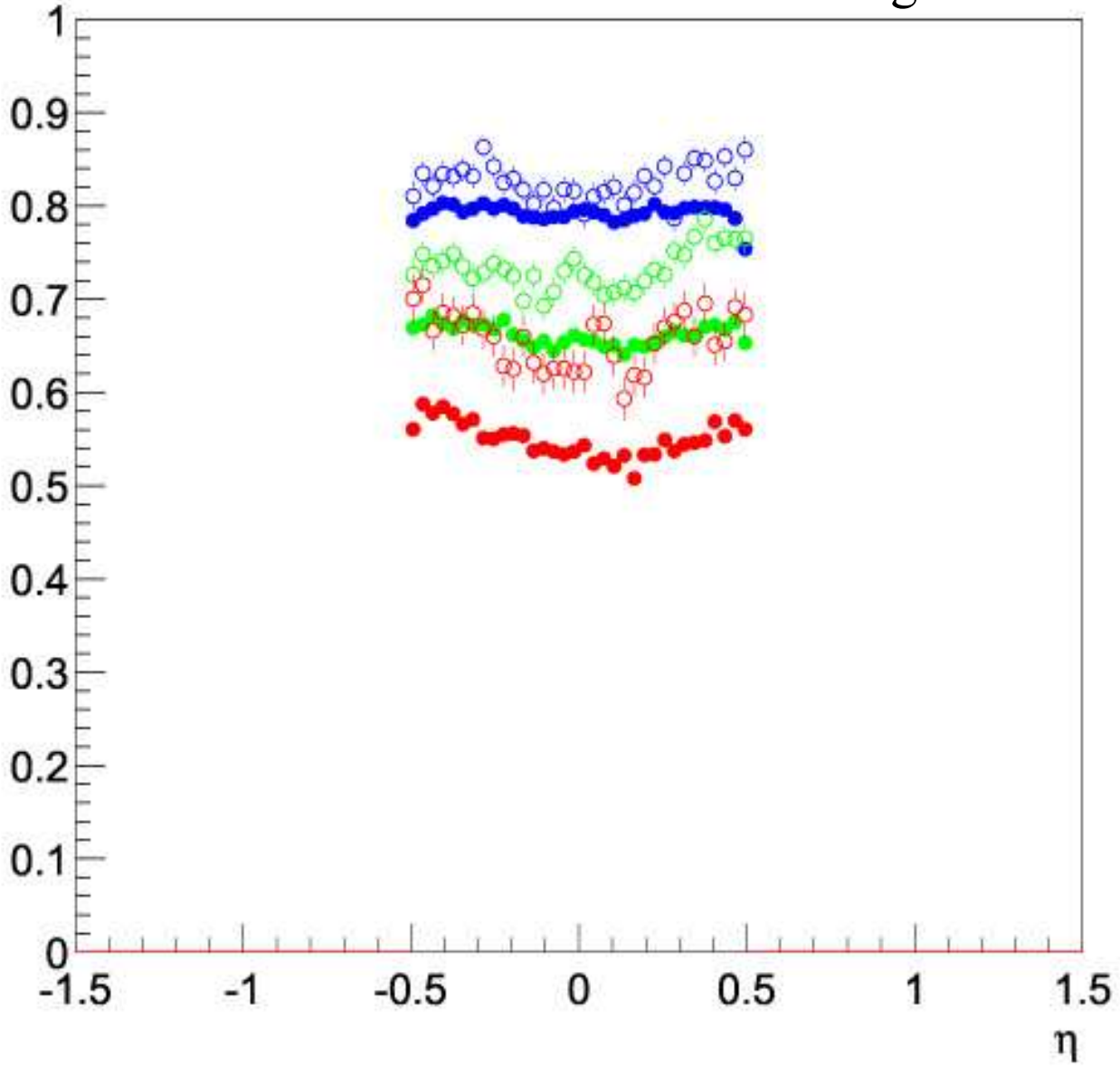
- Current Tracker
- Integrated Tracker



Efficiency vs eta II

Low, Medium, High Multiplicity

- Current Tracker
- Integrated Tracker



Snapshot of tracker and “To Do”

- Shape of distributions are similar to current tracker
  - Mean Fit Points shows similar trends with multiplicity, pt and eta
  - Shape at low fit points shows a bump not seen before

- Efficiency is still low comparted to current tracker
  - Low pT part needs tuning
  - Perhaps a 2nd pass removing hits already used…

- Crucial to increase efficiency
  - Also : test distributions in embedding, need to match real data
    - *Fit points, global DCA, etc.*