ECAL performance with a new clusterizer & tutorial

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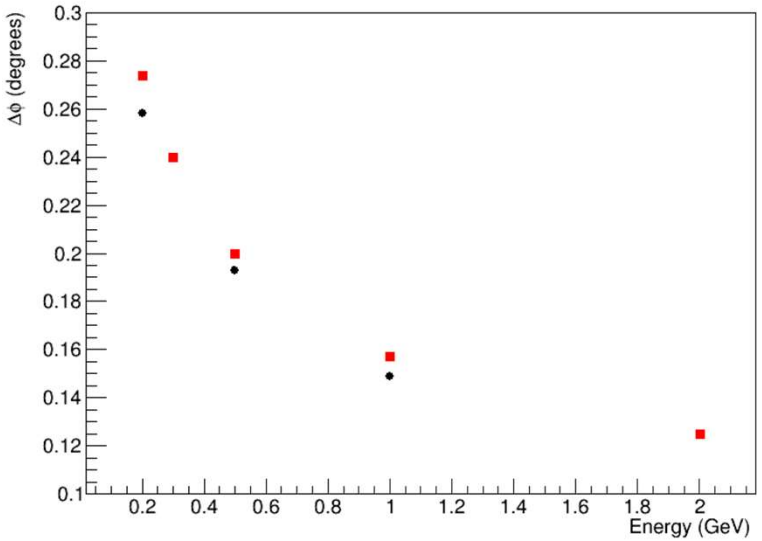
Outline

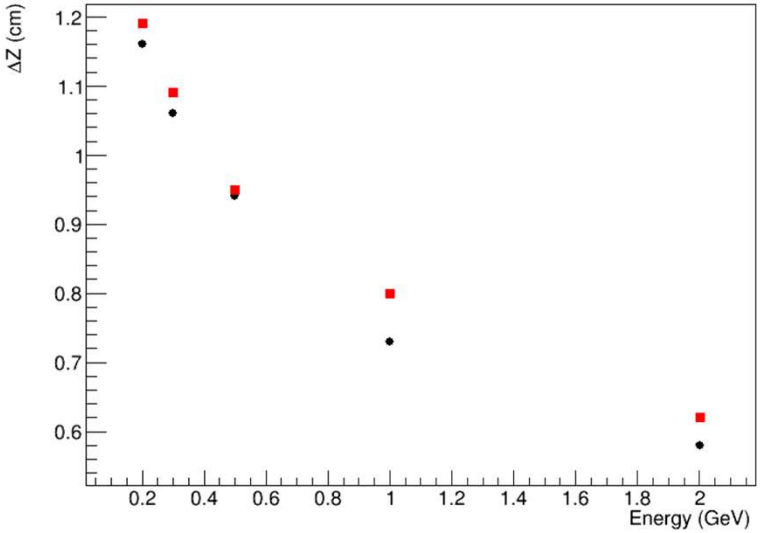
- New clusterizer vs. the previous one (VR), comparison of ECAL performance with similar selection cuts = sanity cross-check:
  - ✓ spatial resolution
  - ✓ energy resolution
  - ✓ photon efficiency & purity
  - ✓ π^0 mass and width vs. p_T
  - ✓ eID efficiency & track matching

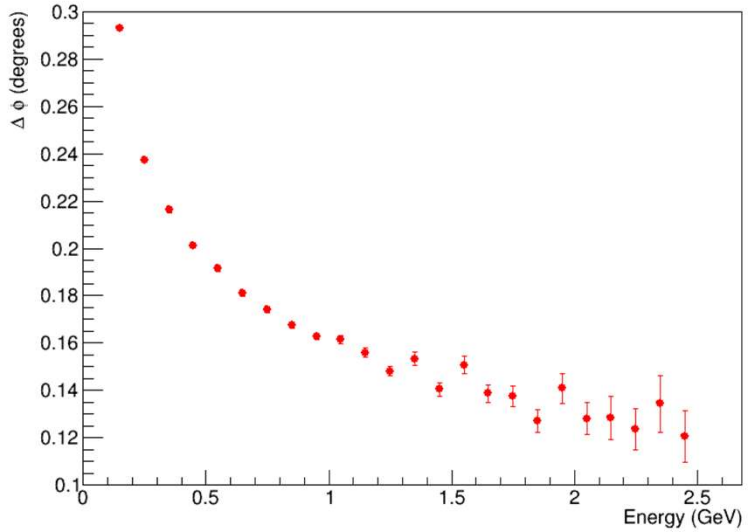
- Tutorial & examples

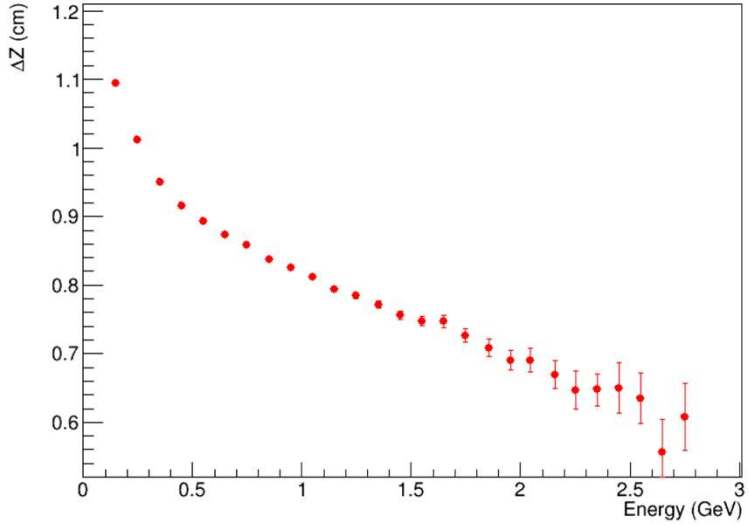
Photon spatial resolution

- Black markers – single photons; Red markers – UrQMD; realistic vertex distribution
- Spatial resolution is compatible



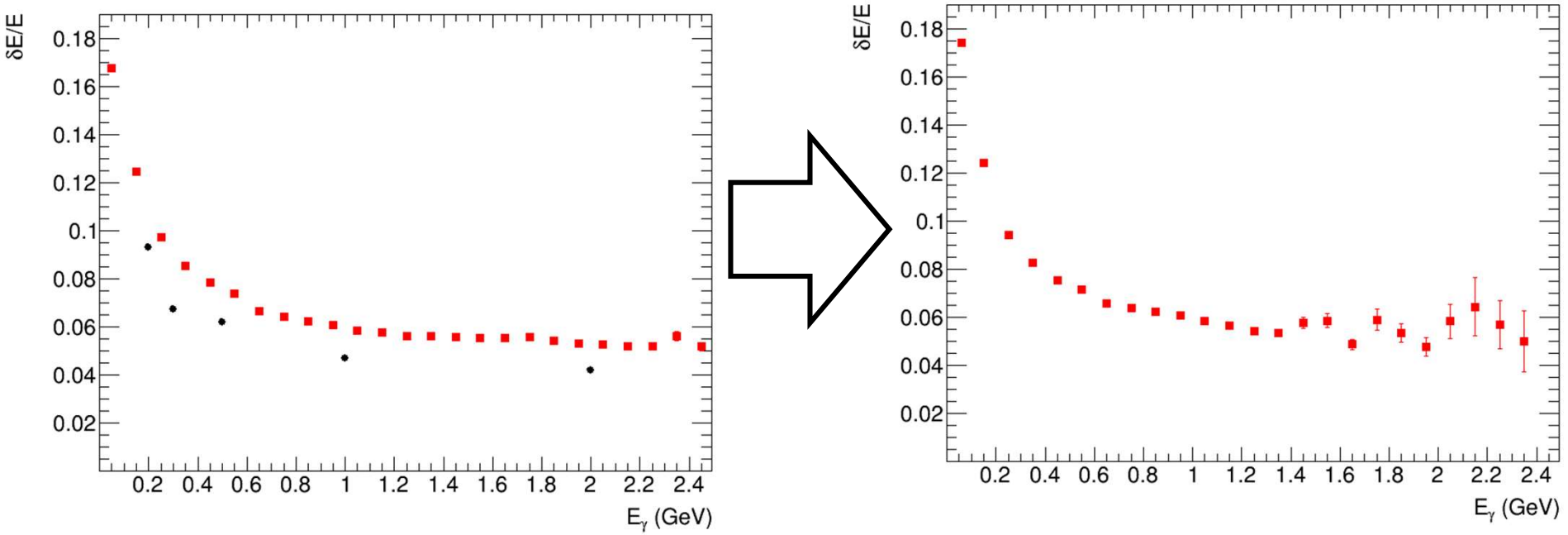






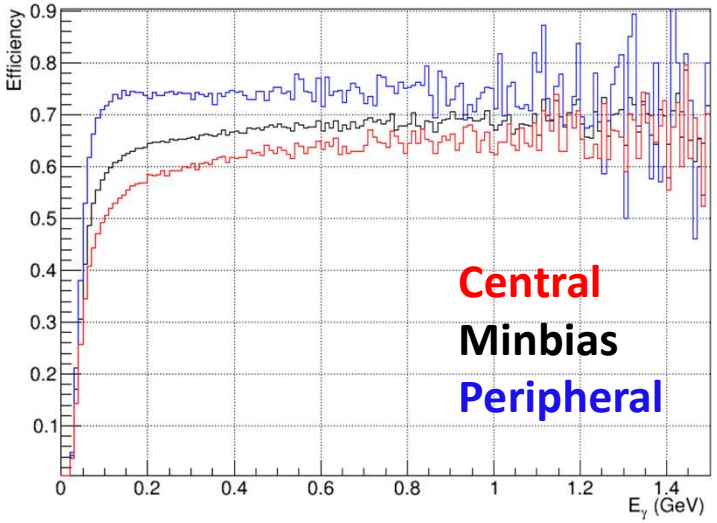
Photon energy resolution

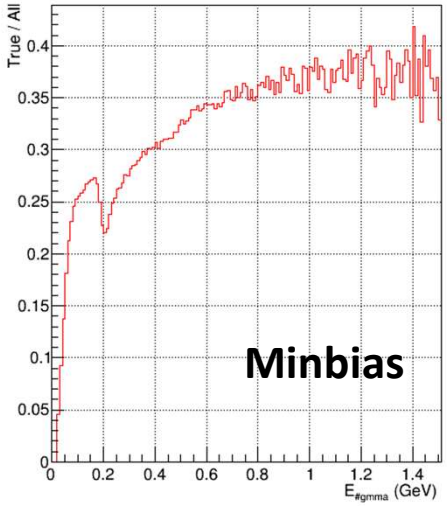
- Black markers – single photons; Red markers – UrQMD; realistic vertex distribution
- Energy resolution is compatible

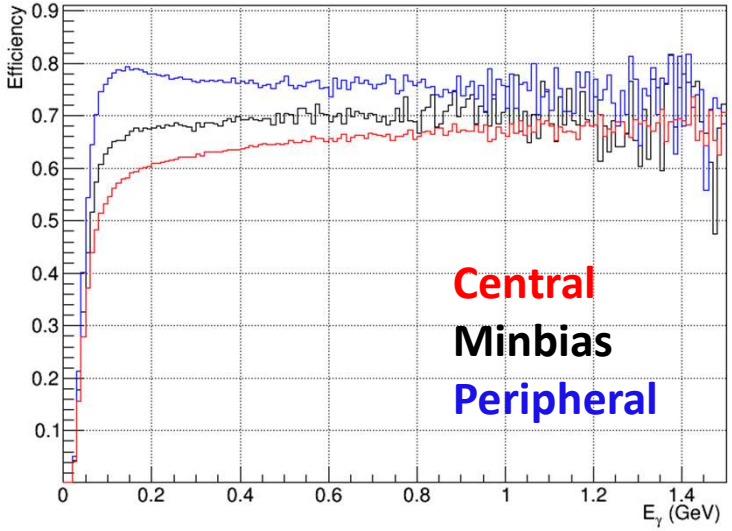


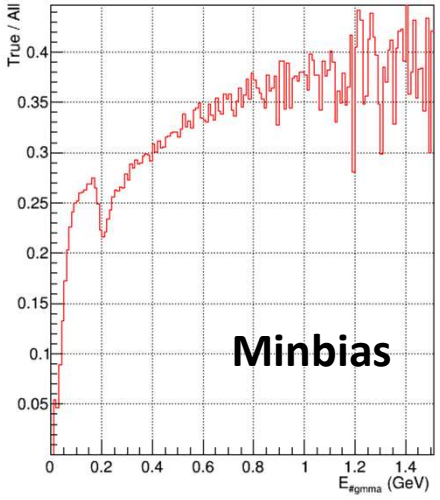
Photon efficiency & purity

- UrQMD; realistic vertex distribution
- Photon efficiency and purity are compatible



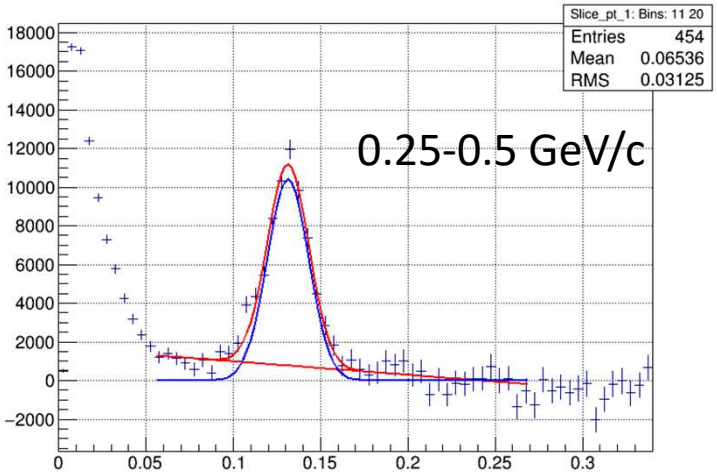


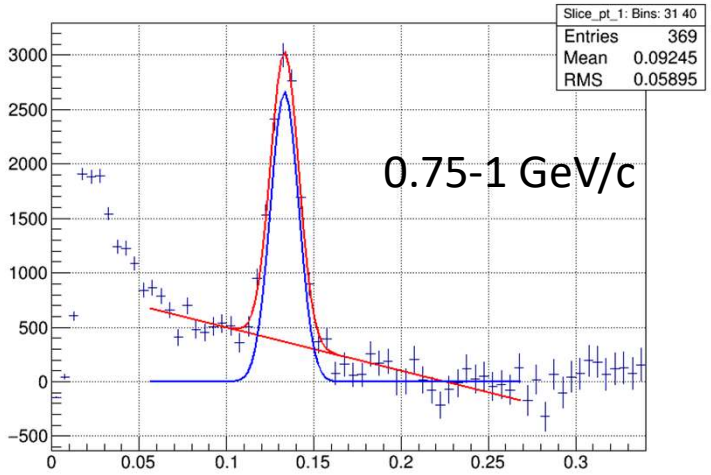


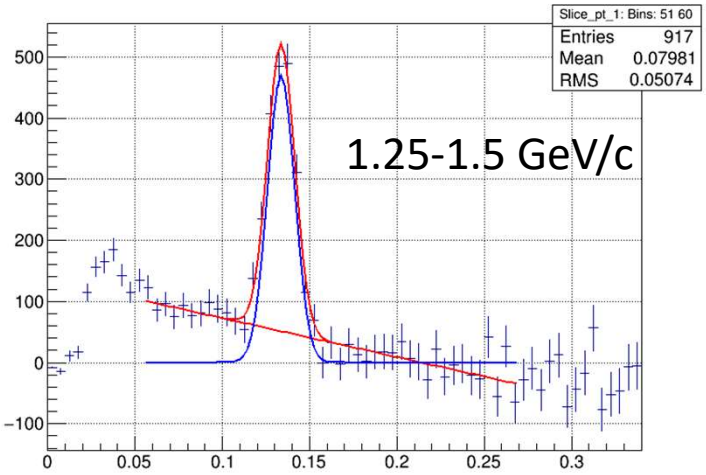


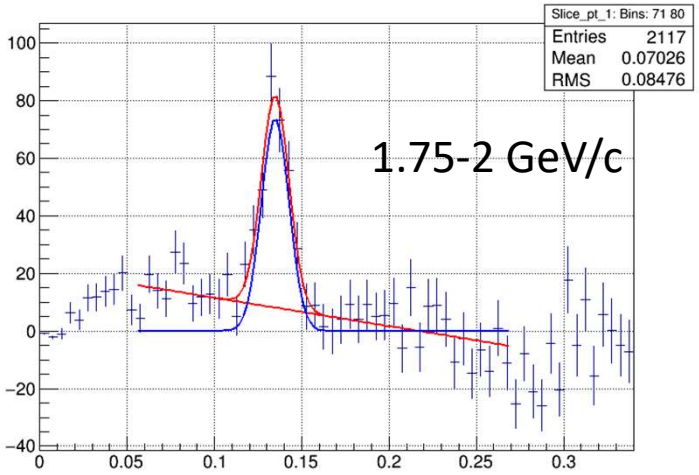
π^0 mass and width

- UrQMD; realistic vertex distribution
- Examples of the reconstructed M_{inv} distributions



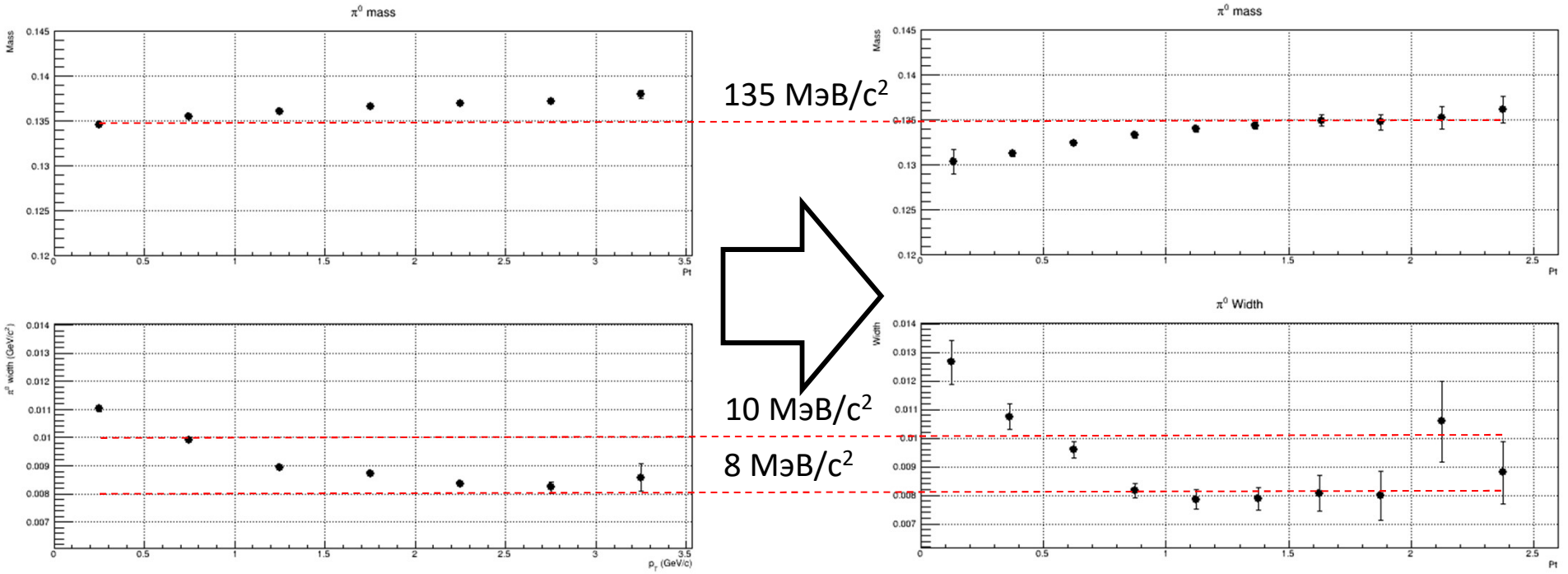






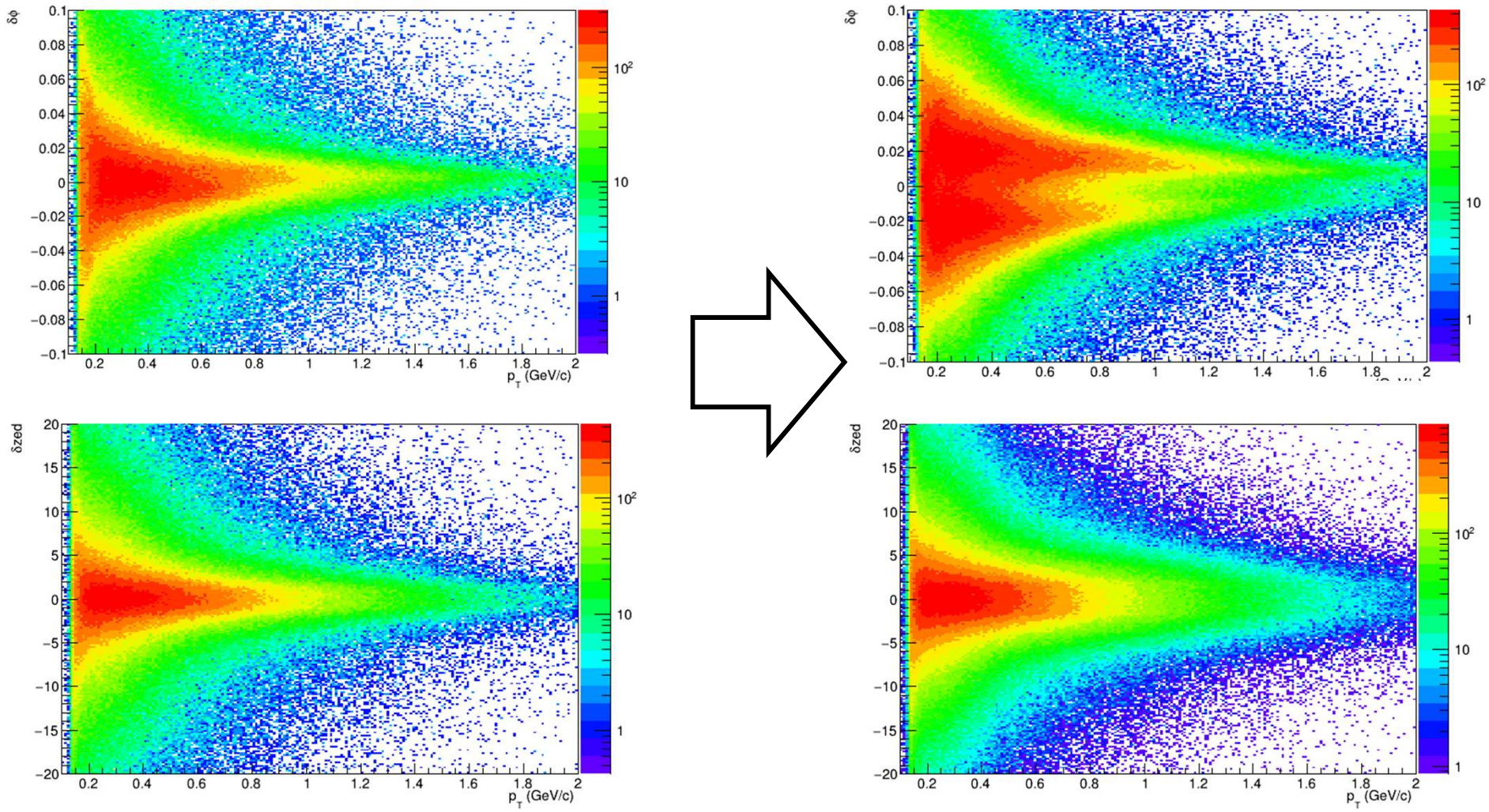
π^0 mass and width

- UrQMD; realistic vertex distribution
- Reconstructed masses and widths are compatible



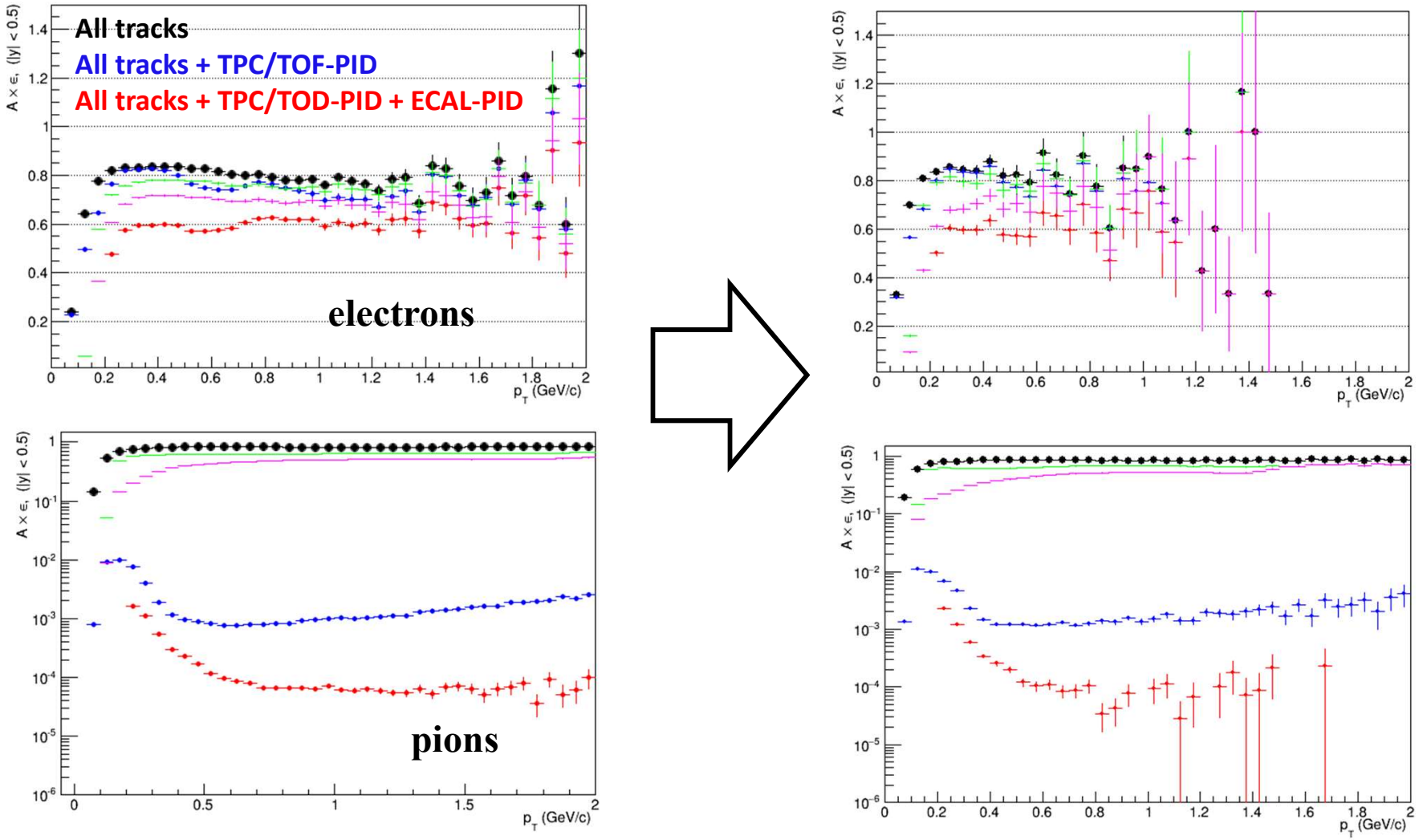
Track to cluster matching

- UrQMD; realistic vertex distribution
- Track matching is inferior → track extrapolation radius is to be tuned



eID efficiency and hadron rejection

- UrQMD; realistic vertex distribution
- eID efficiency and hadron rejection are comparable



Tutorial and examples

- Do we have a dedicated place to store subsystem tutorials?
- So far, ECAL tutorial can be found at NICA cluster,
  /eos/nica/mpd/users/riabovvg/ECAL_Tutorial/
- The tutorial includes:

  HowToRun/ – instructions how to run a new clusterizer
  DSTs_SinglePhotons/ – DSTs, fully reconstructed $3 \cdot 10^5$ single photons (0-3 GeV)
  DSTs_UrQMD/ – DSTs, fully reconstructed 100,000 minbias UrQMD events
  Pi0_analysis/ – example of simple macro code for reconstruction of π^0 and the mixed-event background (input – DSTs, output – histograms)
  Photon_analysis/ – example of simple code for analysis of ECAL performance

- Tutorial is a work in progress, it will be updated on request

Conclusions

- New clusterizer shows expected performance
- New clusterizer is ready for collaboration-wide use
- Tuning of new clusterizer will continue … any changes will be reported
- Please report any problems

BACKUP