

A decorative swirl logo in the top left corner, consisting of a black and white yin-yang-like shape surrounded by a textured, swirling pattern.

Calo seeding and GSF for forward tracks

Upgrade Inner Tracker & Egamma Group

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2019-01-09

Environments

- AtlasProduction,20.20.12.1
- Samples 50k each
 - **r10846**, Step 3, 25x100 digital clustering ATLAS-P2-ITK-17-00-01, $\mu = 0$;
 - mc15_14TeV.422029.ParticleGun_single_**ele**_Pt**10**.recon.**RDO**.e5286_s3348_s3347_r10846
 - mc15_14TeV.117050.PowhegPythia_P2011C_**ttbar**.recon.**RDO**.e2176_s3348_s3347_r10846
- Packages
 - Latest IDPVM;
 - InDetCaloClusterROISelector, InDetCaloClusterROIBuilder
- Interested Containers:
 - LArClusterEM Default setting, range from 0~2.47.
 - CaloTopoClusters Topology method, range from 0~**5**.

ROIs in the whole range

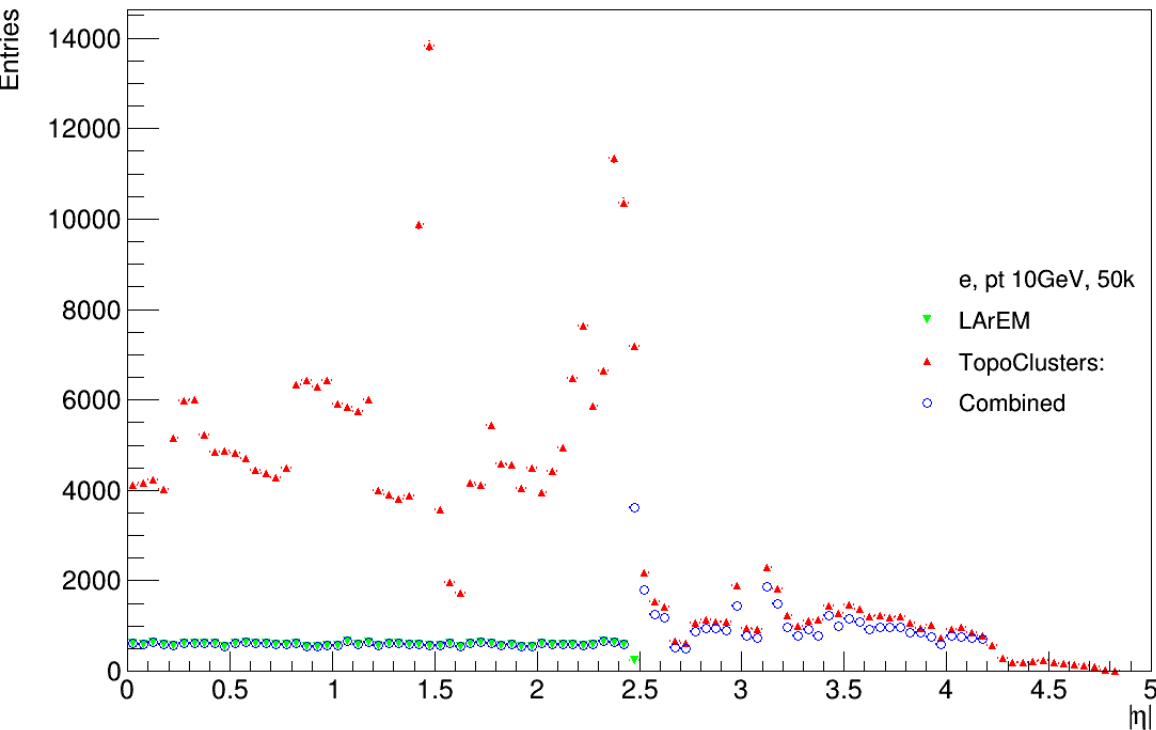
- 3 methods to use clusters are validated:
 1. LAr. default.
 2. Topo. topoclusters in the full range.
 3. Combined:
 - Use LAr with etaBE(2) first;
 - if failed, try LAr with eta()
 - Use clusters from Topo ranges from $2.47 < \eta < 4.2$, with eta().
 - Ideally, it could keep the behavior in central region and use Topoclusters extending to forward.

Caloclusters Eta

would change to -5~5 plot;



N_CaloClusters_vs_eta



For total 50k events:

$\eta < 2.47$: 31474 (From IDPVM)

EMClusters: 29488

TopoCluster: 278168

(~9 times in central)

$\eta > 2.47$: 17511 (From IDPVM)

EMClusters: \

TopoCluster: 36454

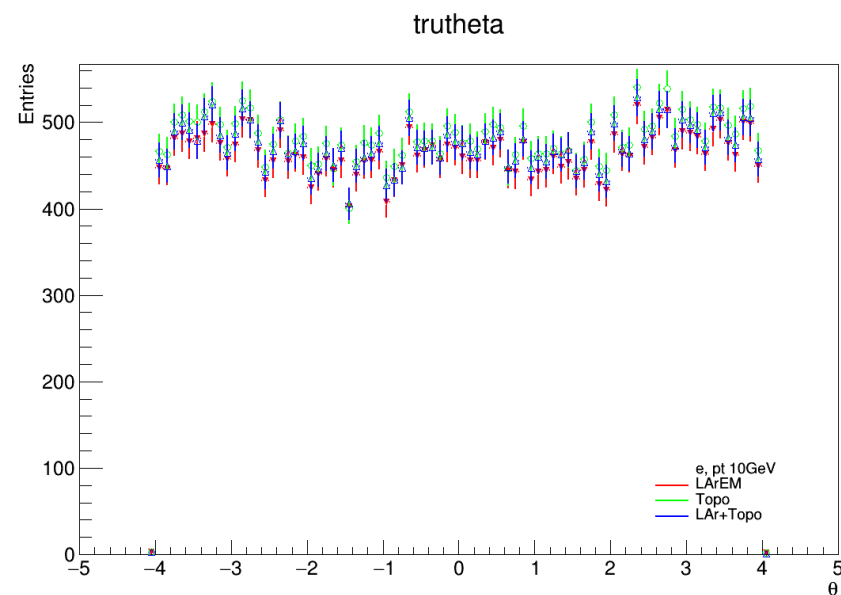
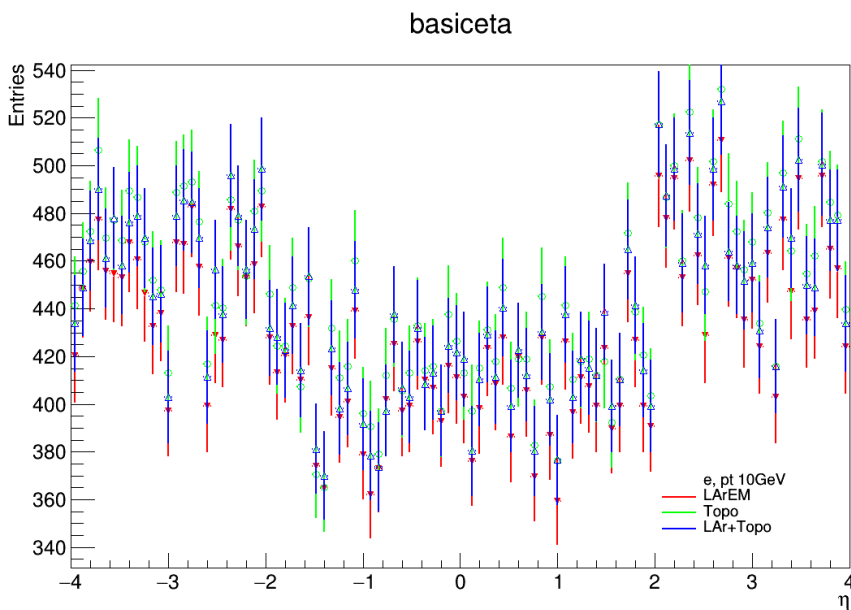
- LAr kept a flat distribution in central region;
- TopoClusters fluctuate from 0 to 4.9; a sharp reduce in 2.47;
 - Strange from 1.37-1.52?

Track eta distribution

From IDPVM.

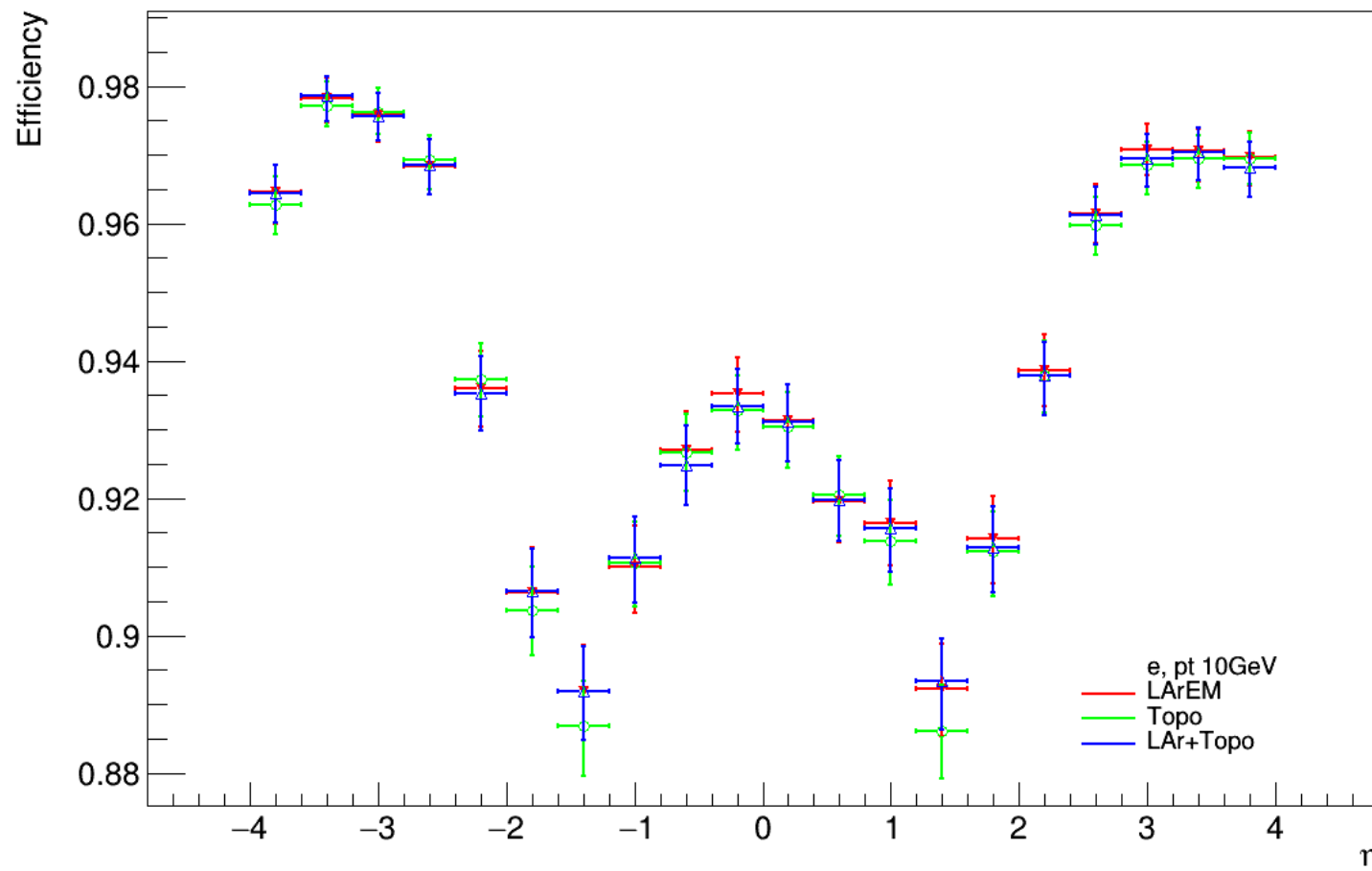
The different ROIs contribute to different InDetParticles, but not significant.

Combined one didn't keep the same behavior as LAr alone in the central region.



Track efficiency

trackeff_vs_eta



Issues

- Different ROIs didn't change the IDPVM distributions directly;
 - So hard to validate the performance
 - May also hard to validate for GSF
- Optimization for ROI selections
 - Multi entries for TopoClusters, esp. in central region;
 - Cuts like E_t ?
- Use E_t cut 500MeV to suppress the Topo candidates
- Make sure Combined has the same performance with LAr in central, and Topo in forward.

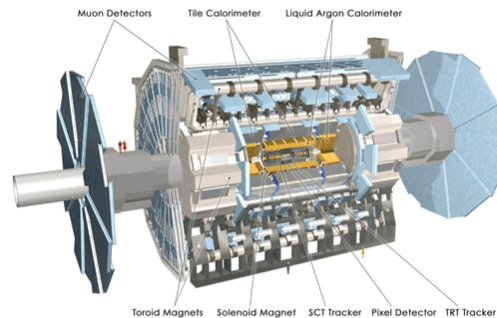
ATLAS webpage

- <http://atlas.ihep.ac.cn/atlashome.html>

ATLAS



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The ATLAS detector at CERN's Large Hadron Collider (LHC) is the biggest detector in high energy physics. The goal of ATLAS is to search for Higgs particle as well as beyond standard model (BSM) new physics. IHEP ATLAS team plays an important role in the Higgs study and BSM searches such as di-Higgs, SUSY as well as SM physics. IHEP also participates in the ATLAS Phase-II Inner Tracker Upgrade project.

IHEP ATLAS team plays an important role in the study of Higgs and searches for the BSM physics and participates in the ATLAS Phase-II Inner Tracker Upgrade project. Currently, members of our group are working on the following activities:

- Leading ATLAS physics analyses, including Searches for New Physics beyond the SM, understanding the properties of the Higgs boson.
- On-site at CERN operating the pixel detector for the 13 TeV run.
- Performing in-house R&D towards a replacement tracking detector, designed to operate at ten times the current rate of collisions for the High-Luminosity upgrade of the LHC in next decade (HL-LHC).

IHEP ATLAS team has around 20 faculties, 10 postdocs and 20 Ph.D. students. We have wide collaborations with international labs/institutes on physics analysis, ITK project as well as training students. The students or postdocs are expected to spend some time working at CERN, located at the Franco-Swiss border near Geneva, on the detector operations, shifts and physics analyses working closely with international colleagues in ATLAS collaborations.

- HH Multilepton Kickoff 2019-01-18?