Fastsim validation

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<u>Outline</u>

Samples Used

Comparison in individual PtHat bins

Comparison for the full sample

Remarks

Fastsim validation

AllEvents Primary Datasets from CSA07 soups:

Notes, Dataset Names and links to datasets in dbs2 entries:

- **Unfiltered Pythia Soup** the entire AllEvents Primary Datasetwas re-processed with fast sim. Sample name and link to DBS2 entry (3TB):
  - /CSA07AllEvents/CMSSW_1_6_9-FastSim-1205437066/AODSIM
- **Filtered Pythia Soup** 2/3 of the AllEvents Primary Datasetwas re-processed with fast sim. Sample name and link to DBS2 entry (2.4 TB):
  - /CSA07AllEvents/CMSSW_1_6_9-FastSim-1205436948/AODSIM
- **Alpgen Soup** 1/10 of the AllEvents Primary Datasetwas re-processed with fast sim. Sample name and link to DBS2 entry (278 GB):
  - /CSA07AllEvents/CMSSW_1_6_9-FastSim-1205437007/AODSIM

Soups terminology:

- Chowder = Alpgen samples
- Gumbo = Unfiltered Pythia samples
- Stew = Filtered Pythia samples

for details about soups dataset content see the CSA07Physics twiki page.

The samples have been simulated with the 100pb-1 miscalibration and misalignement scenario. They should be compared with the equivalent Full Sim samples:

FastSim sample name	corresponding FullSim
/CSA07AllEvents/CMSSW_1_6_9-FastSim-1205437066/AODSIM	/CSA07AllEvents/CMSSW_1_6_7-CSA07-Gumbo-B1-PDAllEvents-ReReco-100pb/AODSIM
/CSA07AllEvents/CMSSW_1_6_9-FastSim-1205436948/AODSIM	/CSA07AllEvents/CMSSW_1_6_7-CSA07-Stew-B2-PDAllEvents-ReReco-100pb/AODSIM
/CSA07AllEvents/CMSSW_1_6_9-FastSim-1205437007/AODSIM	/CSA07AllEvents/CMSSW_1_6_7-CSA07-Chowder-A2-PDAllEvents-ReReco-100pb/AODSIM

Tools used:

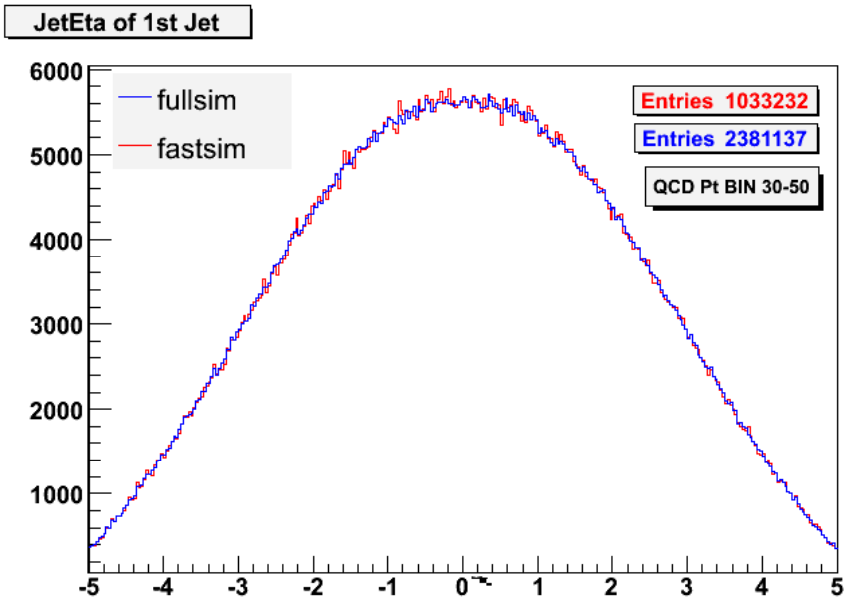
Iterative Cone5 Jets (IC5) are considered

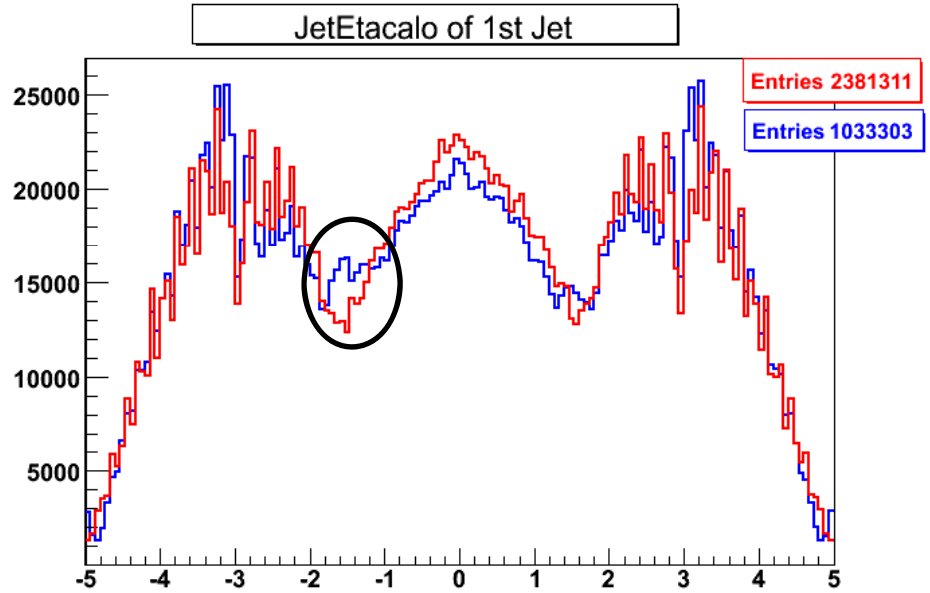
For calojets – iterativeCone5CaloJets
For genjets – iterativeCone5GenJetsPt10 (as otherwise not available)

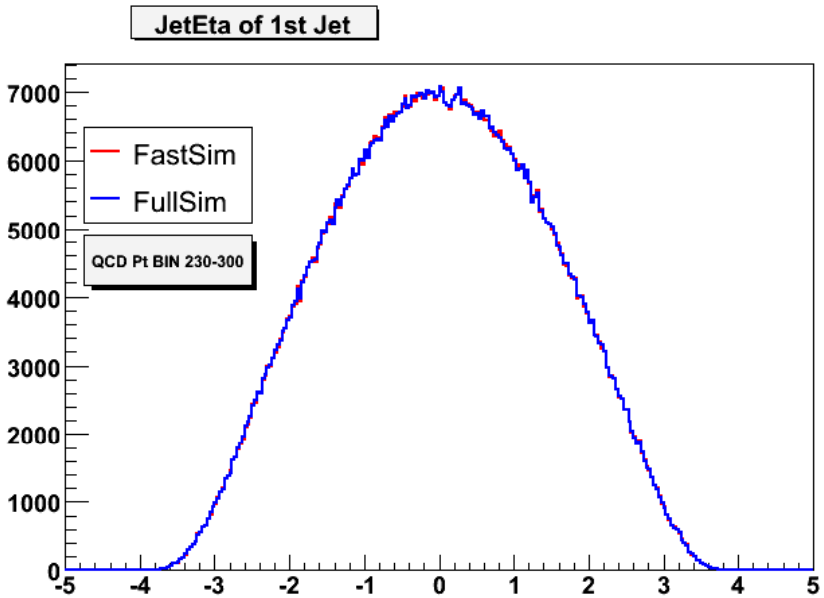
There was one more tag available - iterativeCone5GenJetsNoNuBSM
I did not use that !

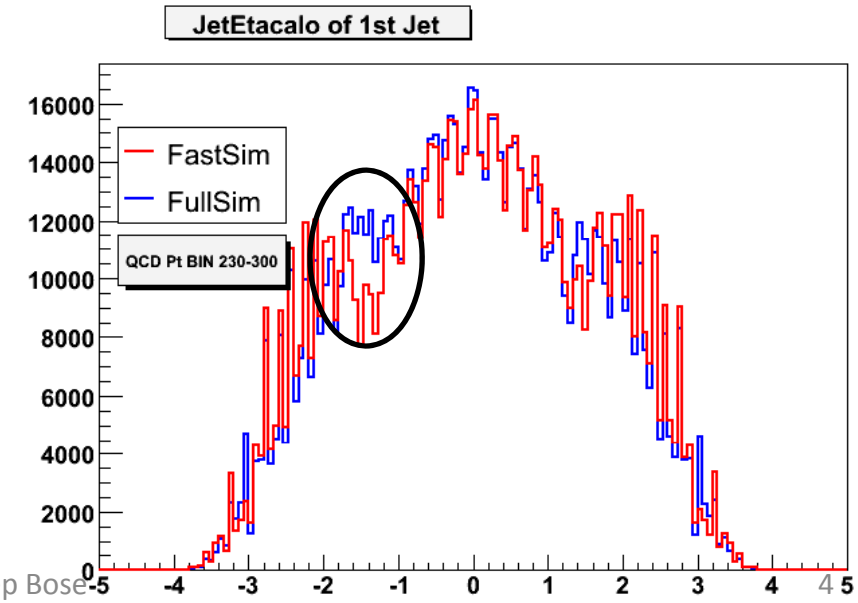
Two sample pthat bins are shown -
As a low pthat bin : 30-50
As a high pthat bin : 230-300

Leading jet Eta distribution – Gen and Calo : Low and High pthat bins

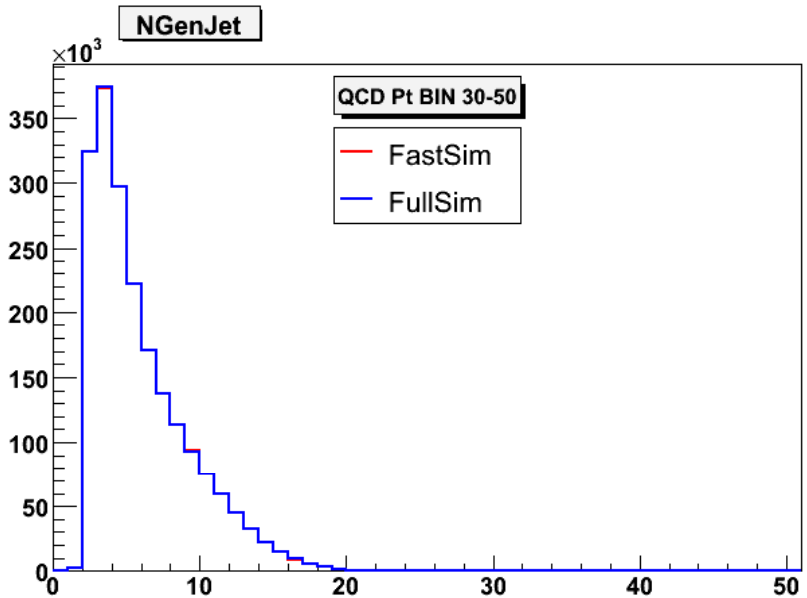


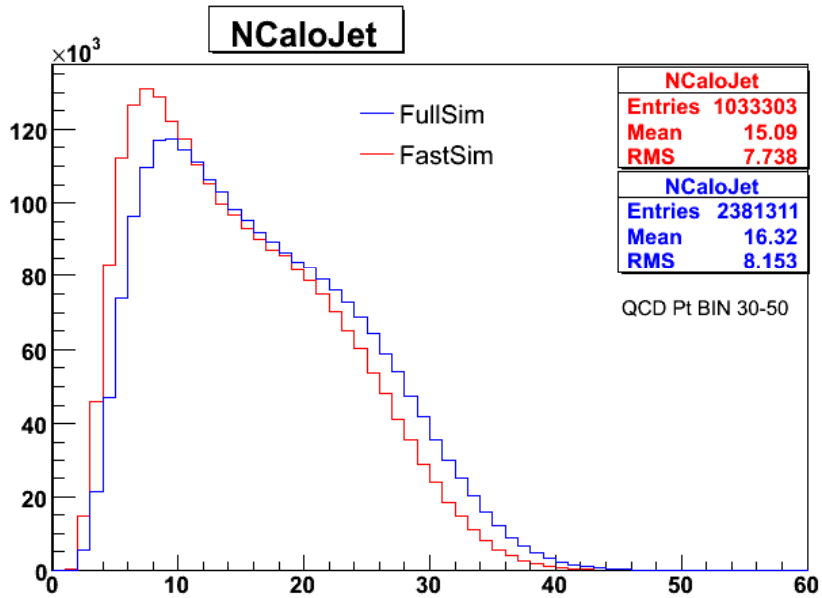


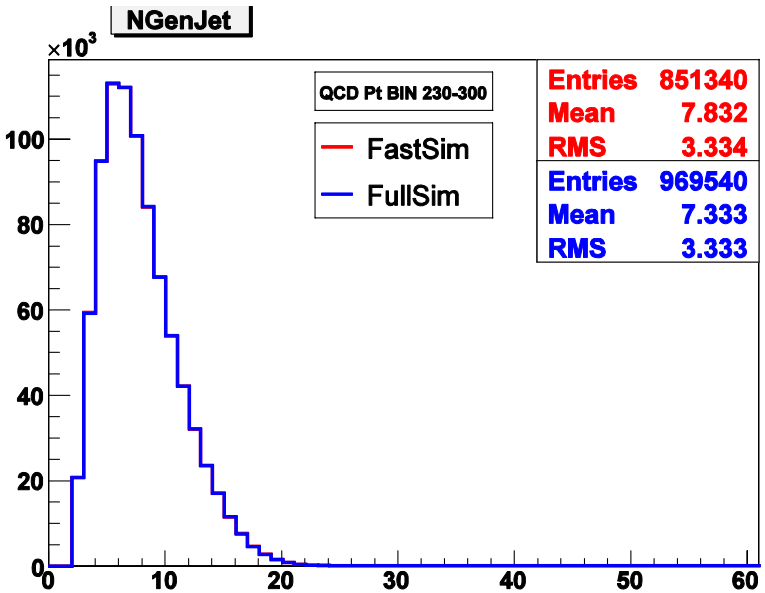


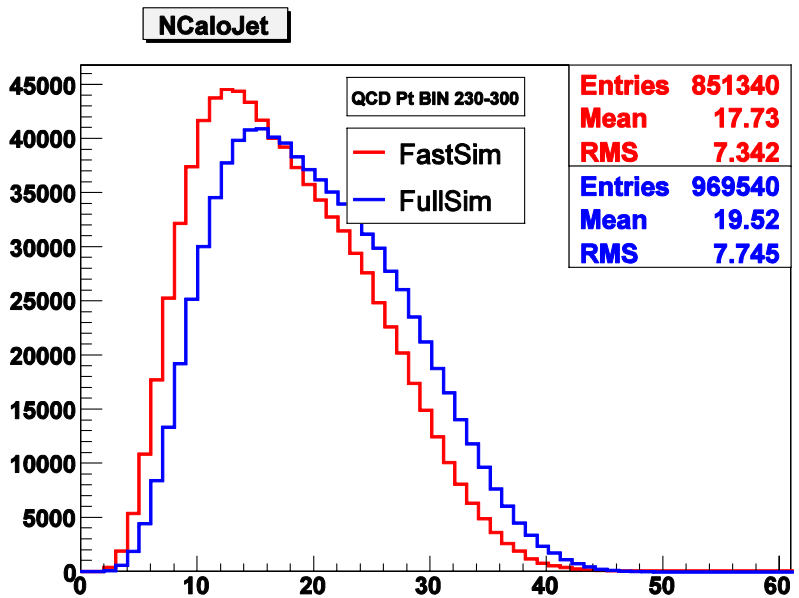


Jet Multiplicity – Gen and Calo : Low and High pthat bins

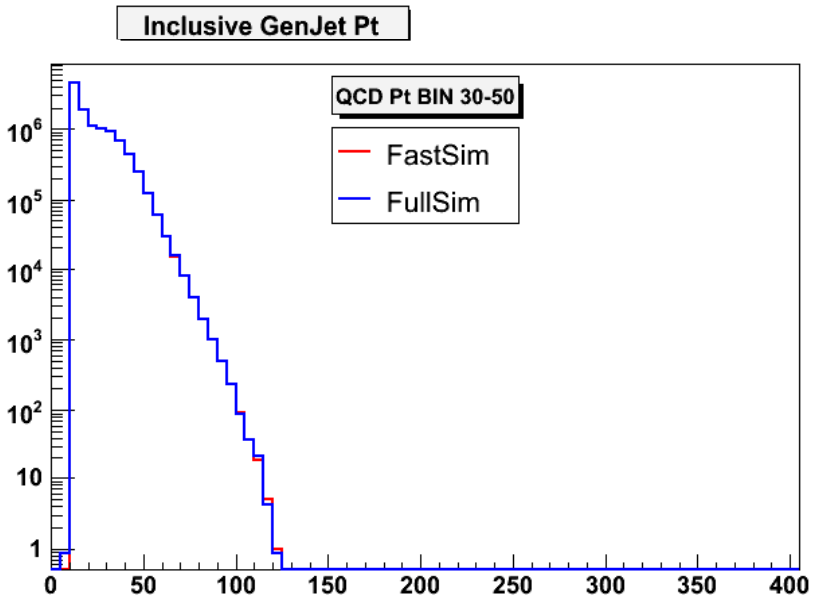


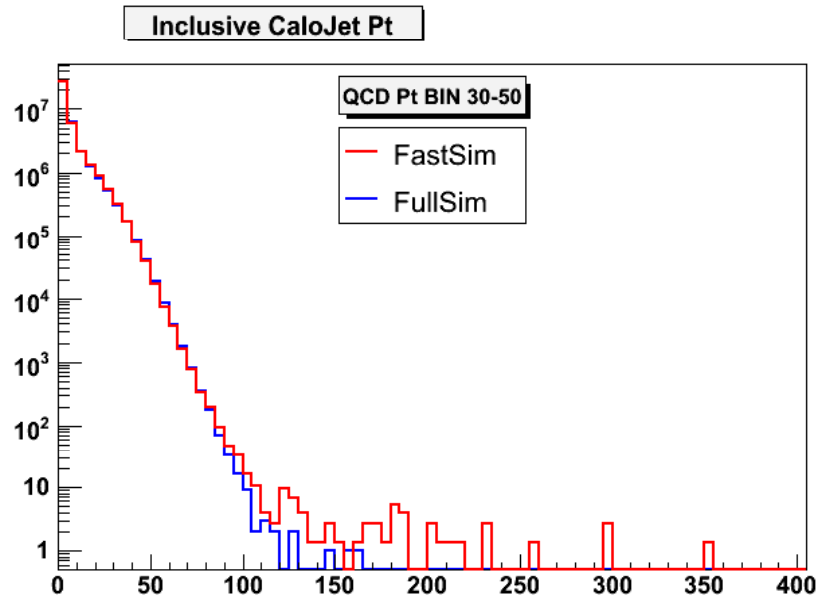


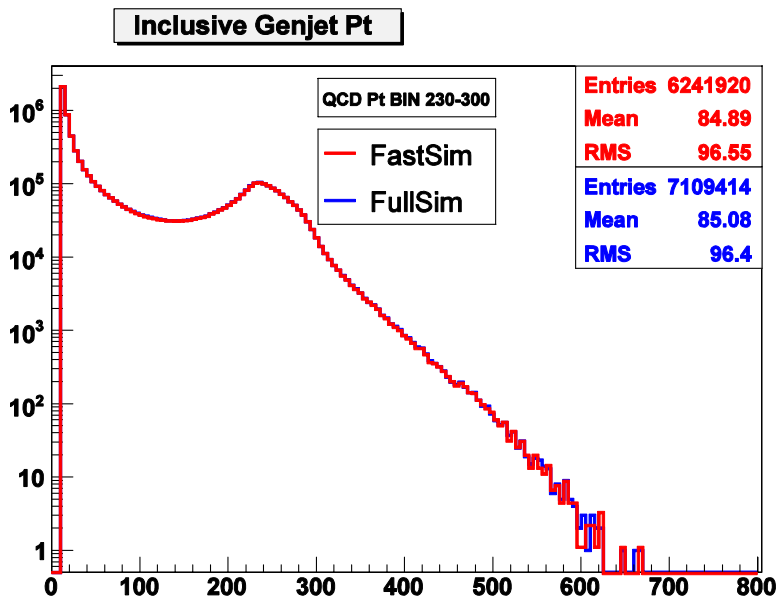


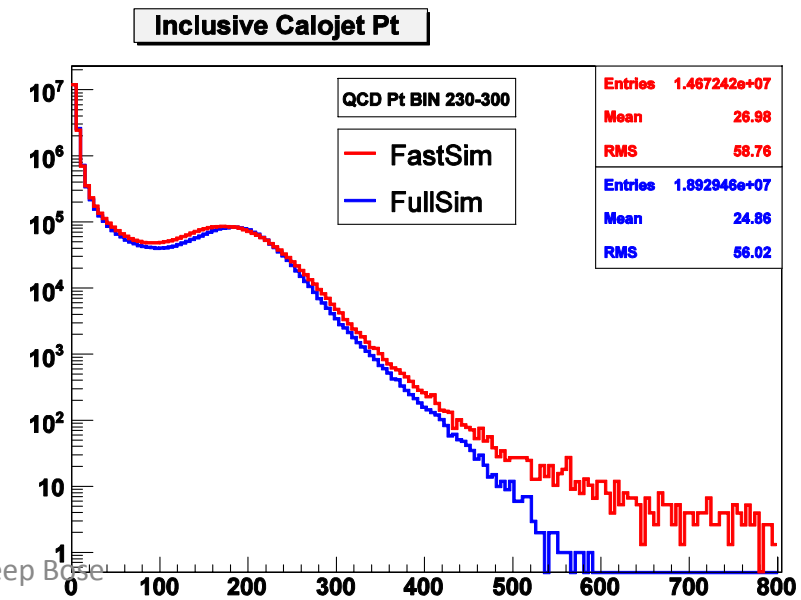


Inclusive Jet Pt distribution – Gen and Calo : Low and High pthat bins

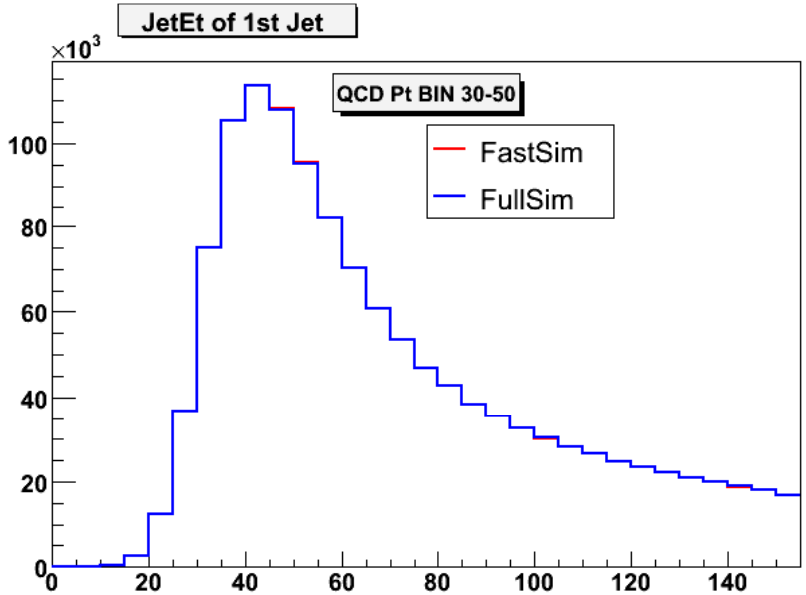


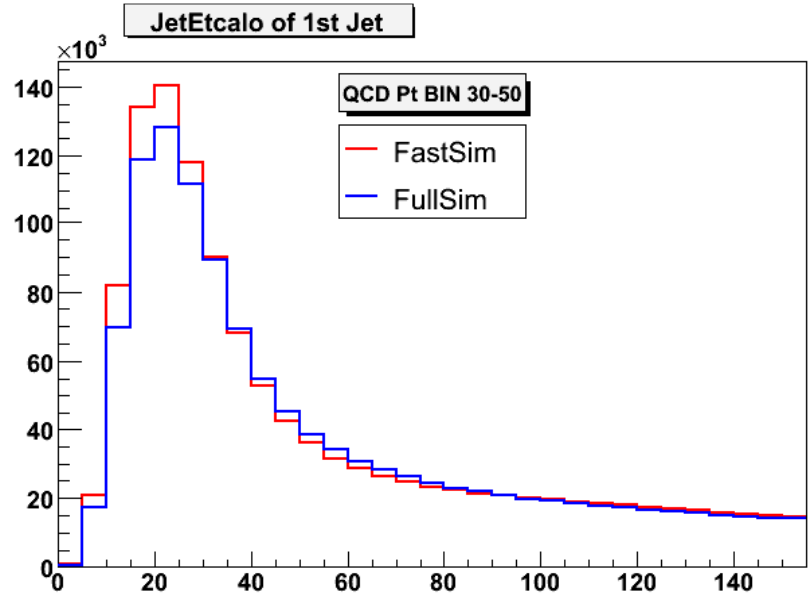


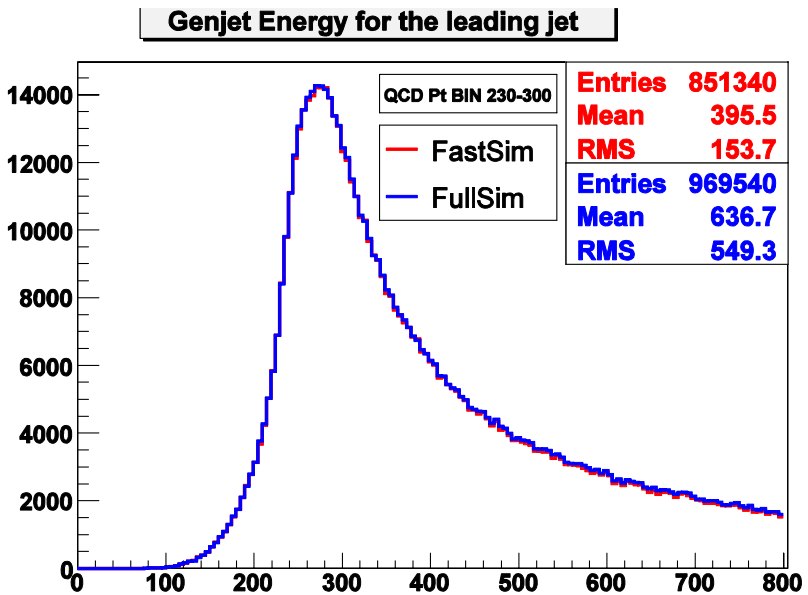


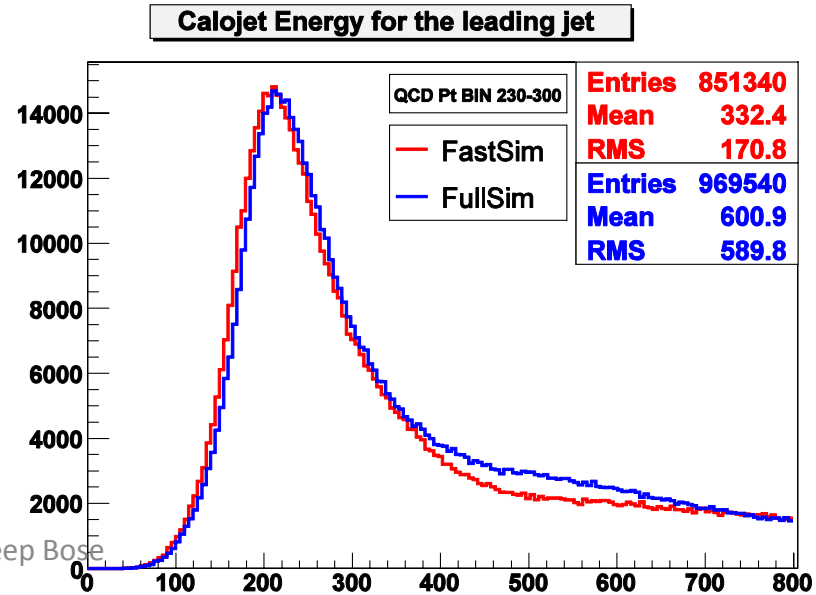


Leading jet Energy distribution – Gen and Calo : Low and High pthat bins

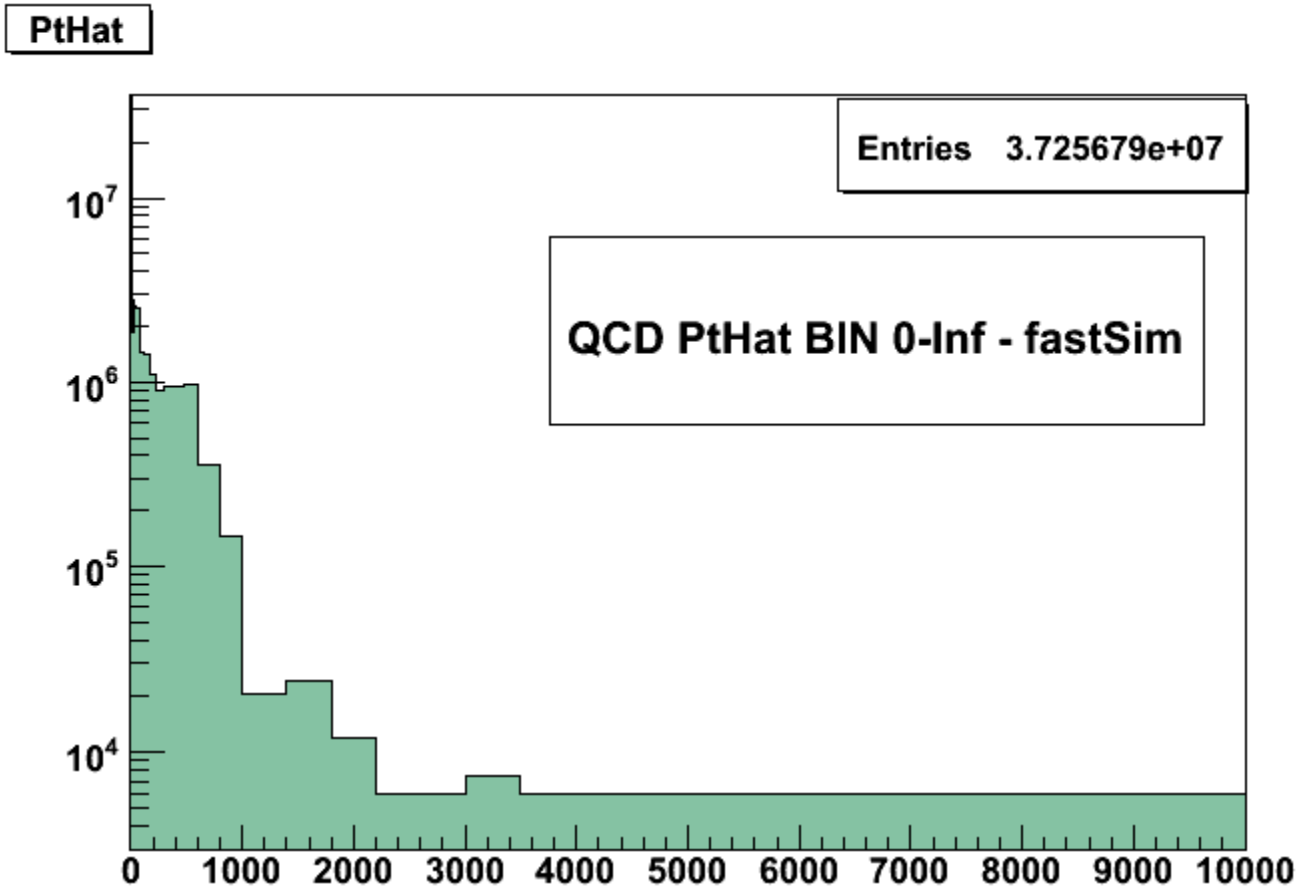




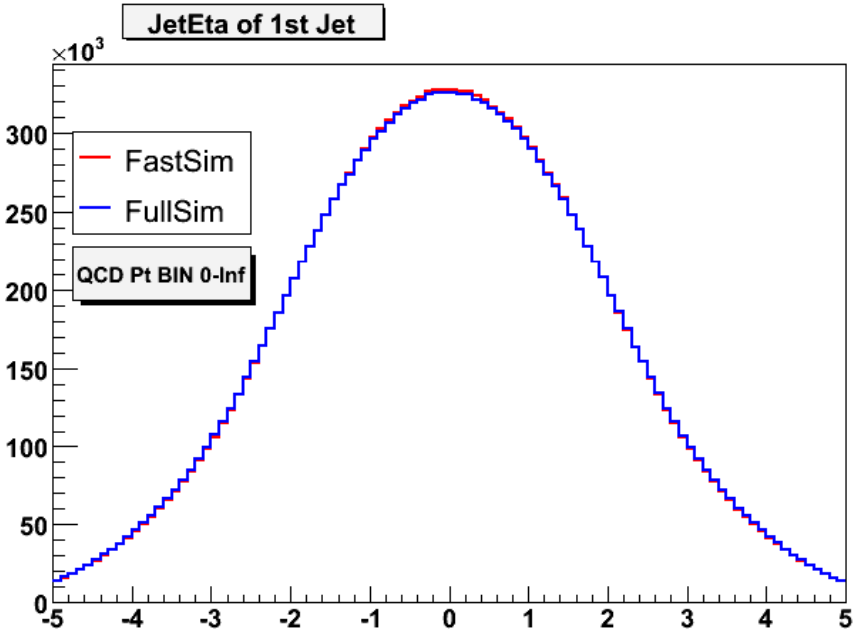


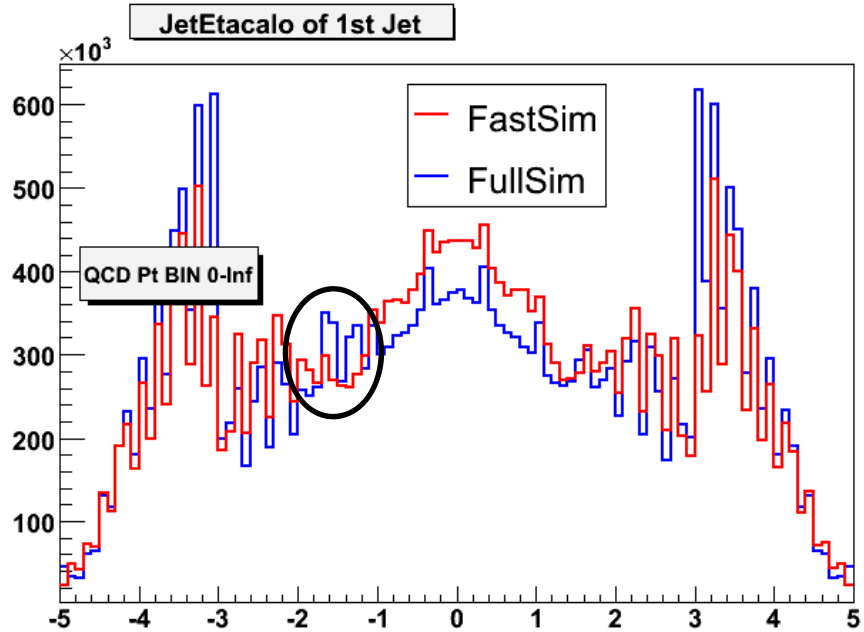


EventCounter over entire Pthat distribution for the fastsim soup Gumbo(*unfiltered pythia*)

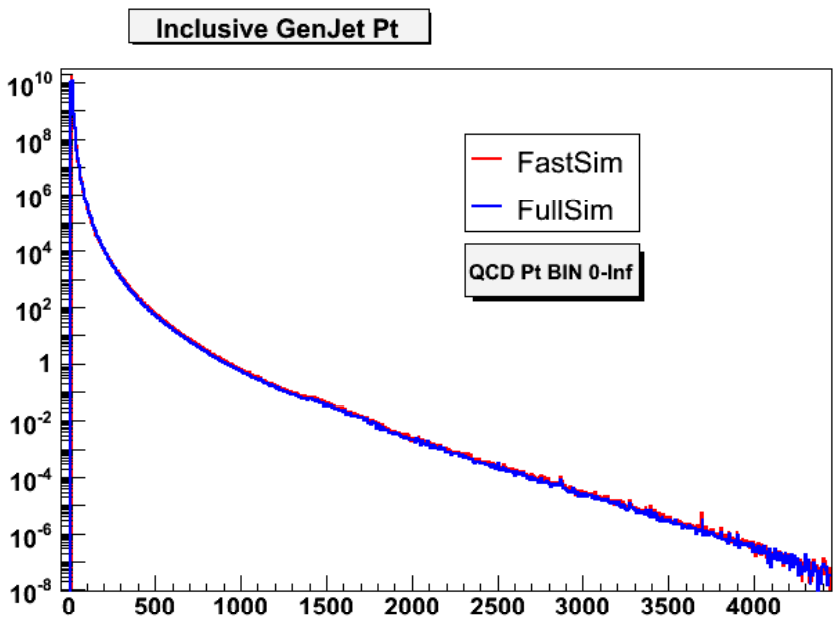


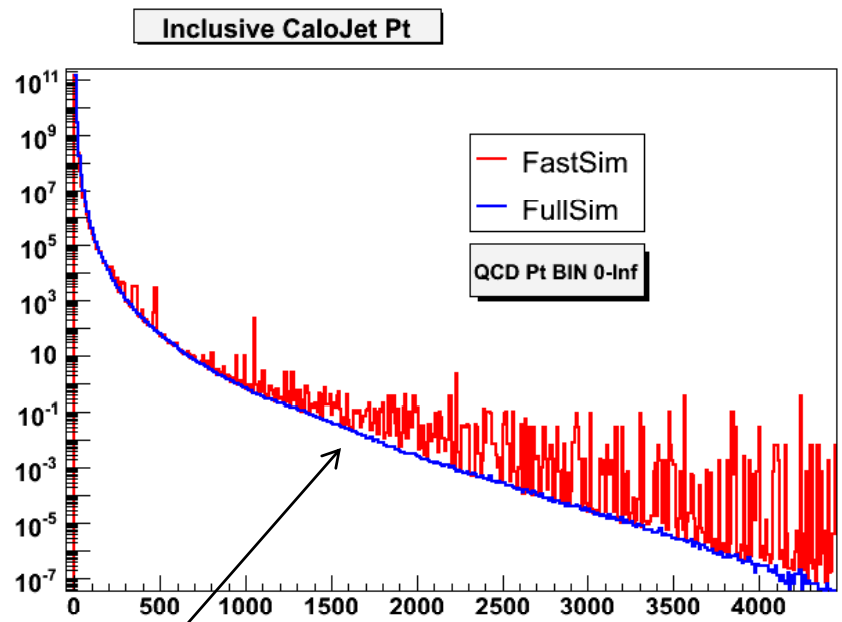
Eta distribution over the entire fastsim soup
Gumbo(*unfiltered pythia*)





Inclusive GenPt and CaloPt distributions over the entire soup Gumbo(*unfiltered pythia*)

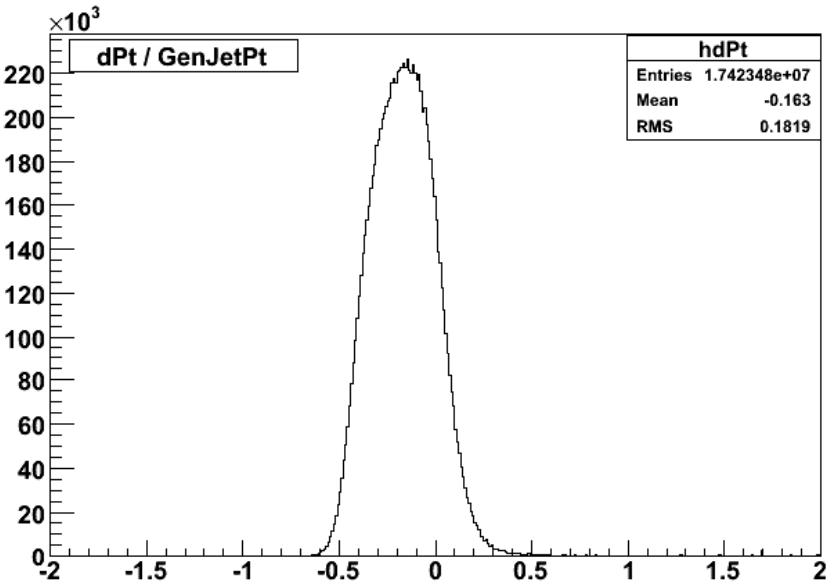


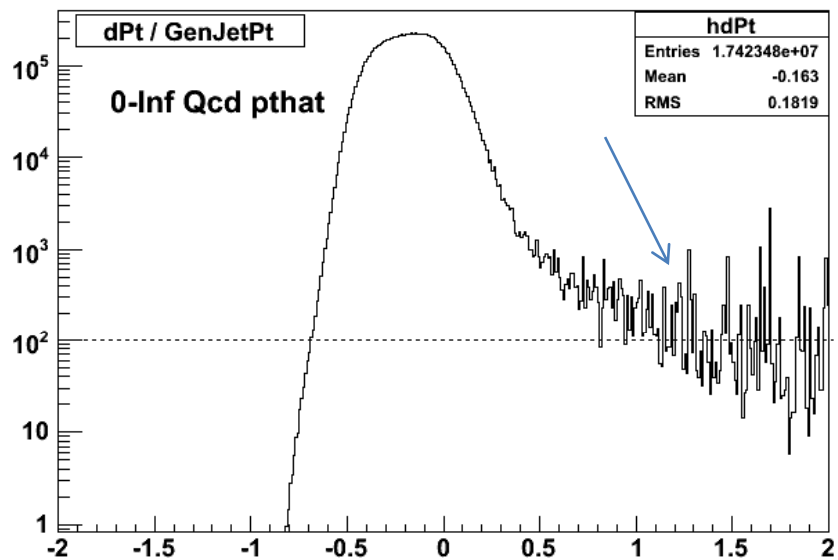


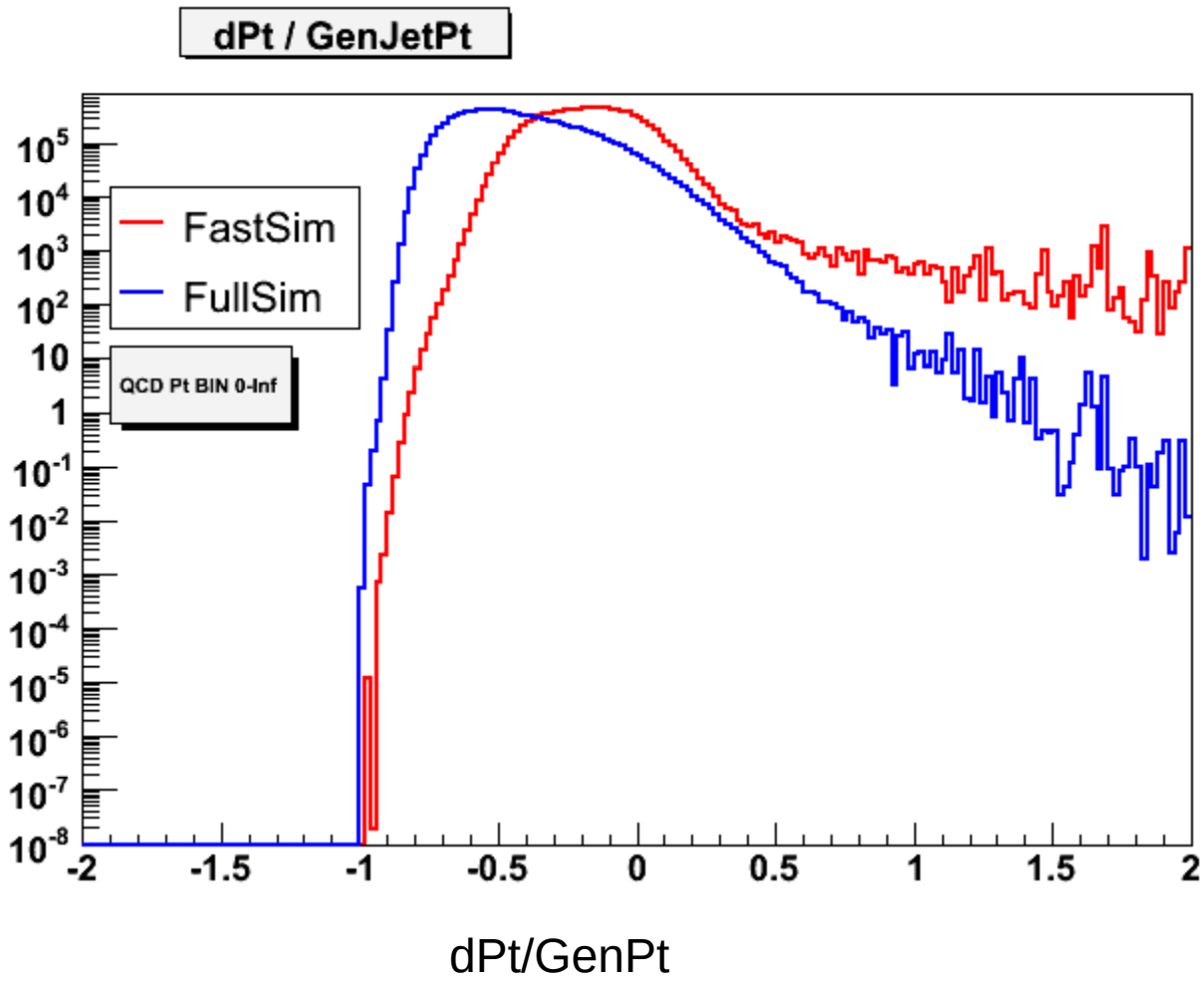
Extra weight from tails of individual pthat bin

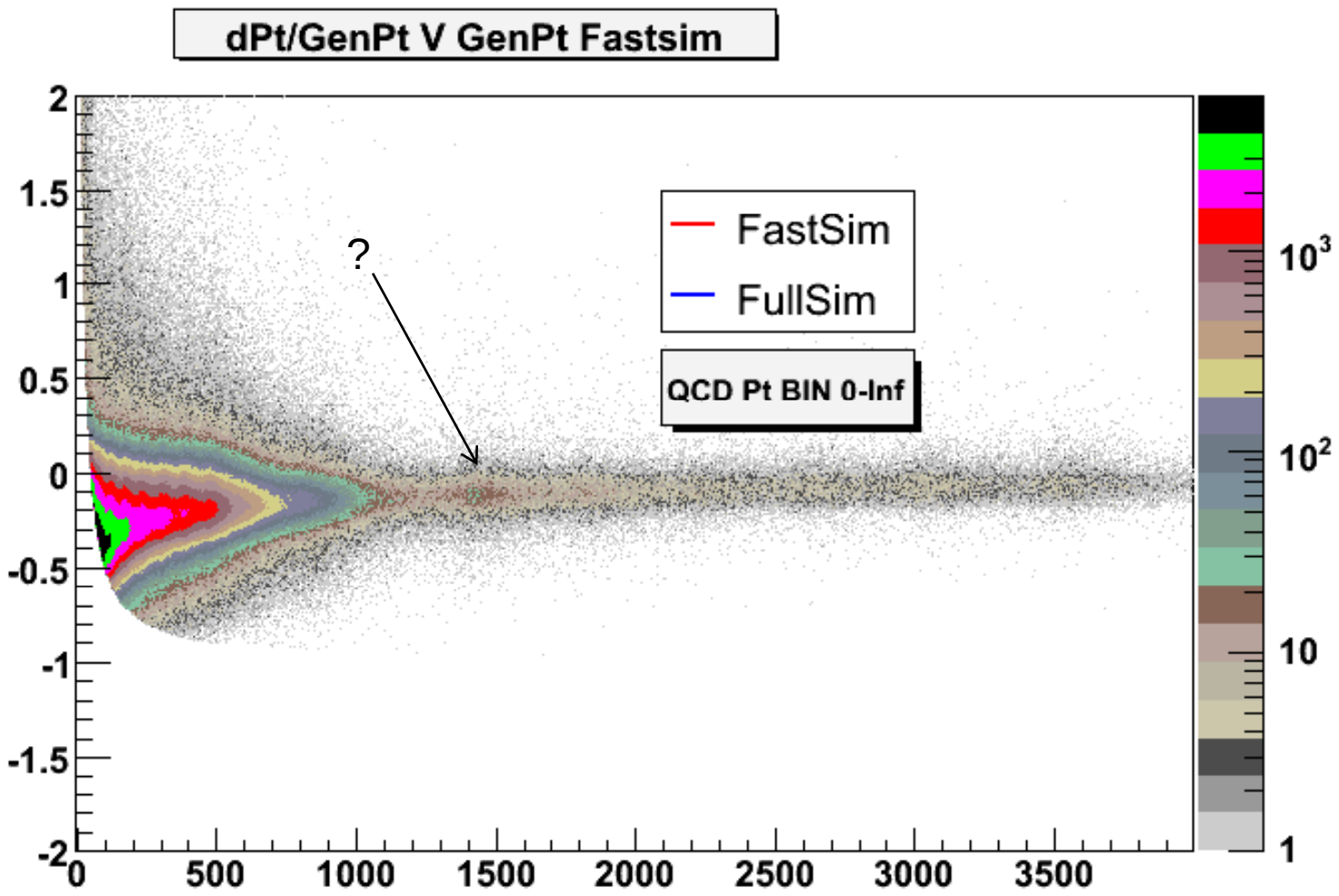
dPt = CaloJetPt – GenJetPt
Matching radius 0.25
CaloJetPt threshold 5

dPt/GenPt for the entire fastsim soup (weighted)
Gumbo(*unfiltered pythia*)






dPt / GenJetPt
FastSim
FullSim
QCD Pt BIN 0-Inf
10^5
10^4
10^3
10^2
10
1
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
10^-8
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
dPt/GenPt

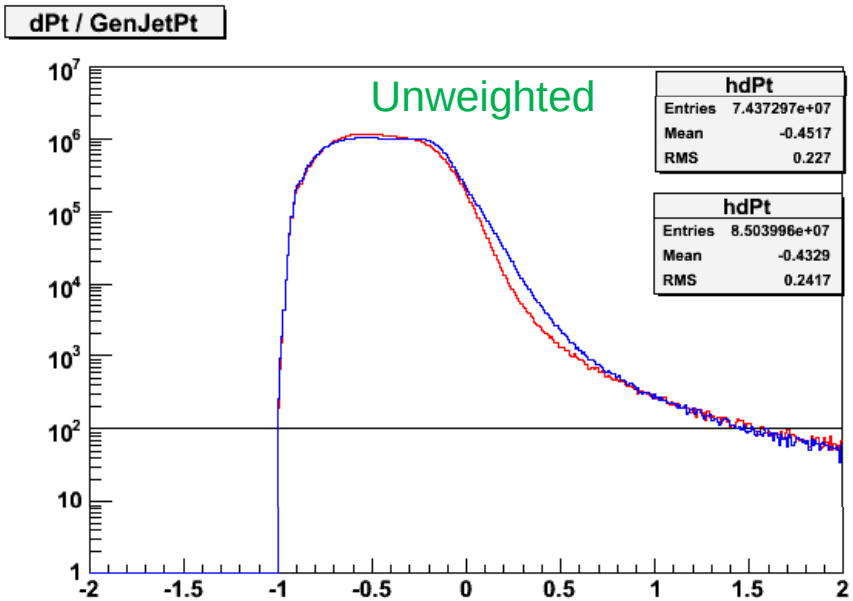
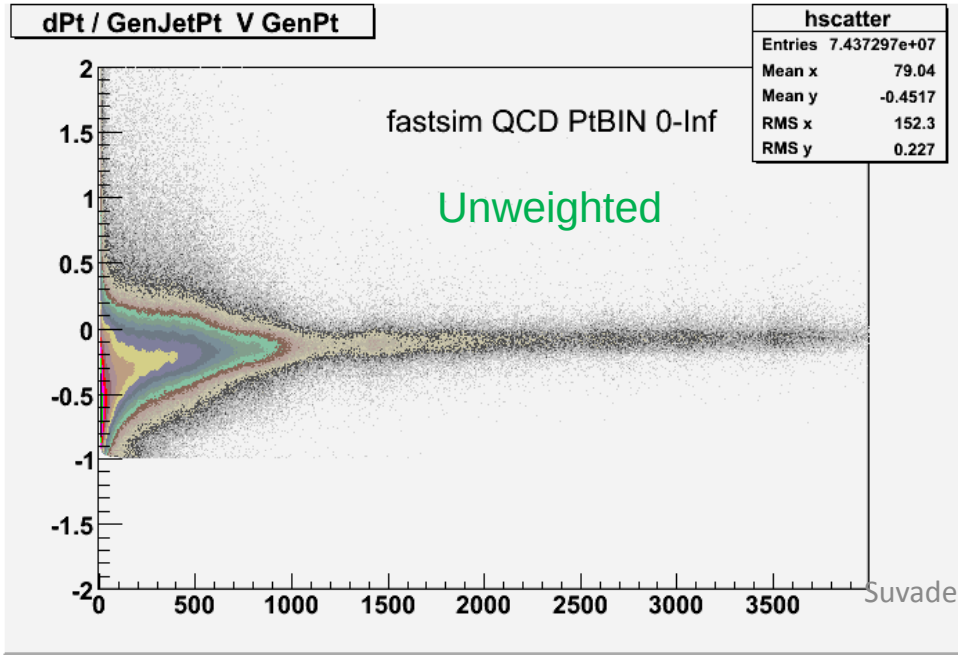
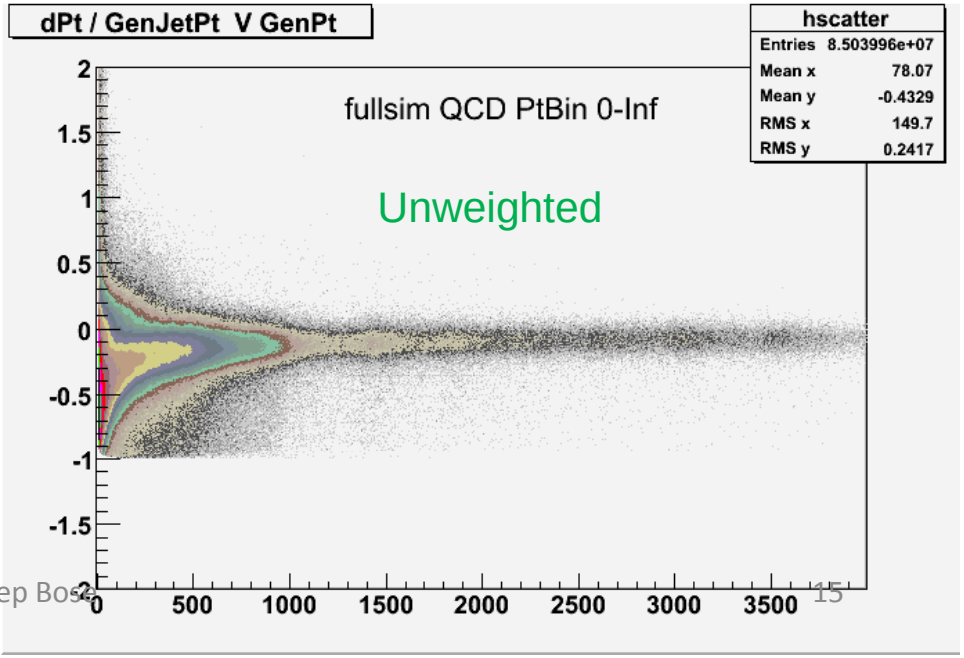

dPt/GenPt V GenPt Fastsim
FastSim
FullSim
QCD Pt BIN 0-Inf
?
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
500
1000
1500
2000
2500
3000
3500
10^3
10^2
10
1

- Remarks:

- Tails in inclusive pt distribution seen in fastsim
- Asymmetry in eta distribution in detector level. Mismatch between fast and full.
- Multiplicity of calojets lesser in fastsim.

- Things to do :

- Same comparison for SiS Cone
- Other jet properties in IC5 (dR, dEta, dPhi)

Fastsim / Fullsim dPt/GenPt comparison

With unweighted full sample (0-Inf) ➔