

Backward Hadronic Calorimeter update

Diffraction dijet study with full reconstruction

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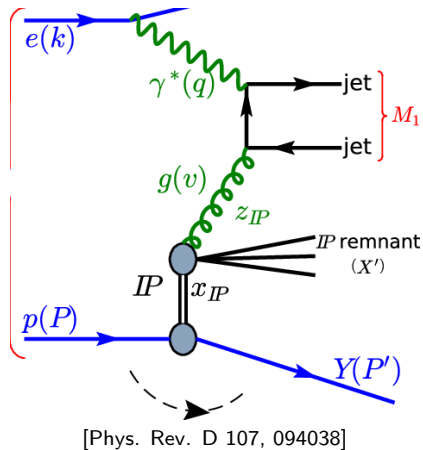
nHCal DSC meeting 20.11.2024



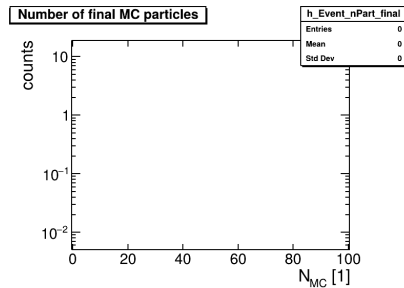
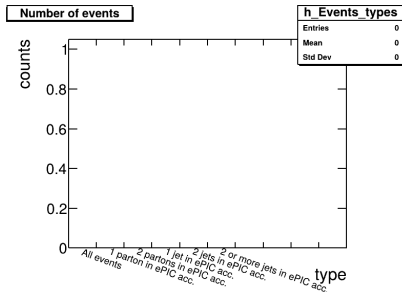
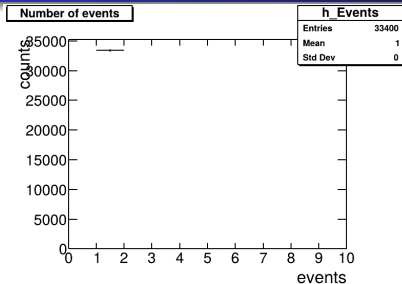
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- 1 Diffractive dijets with nHCal
 - Process
 - Full ePIC reconstruction
 - Events
 - Particles
 - Jet clustering
 - Jets
 - Jets measured
 - Jets measured with neutrals in nHCal

- 2 Summary



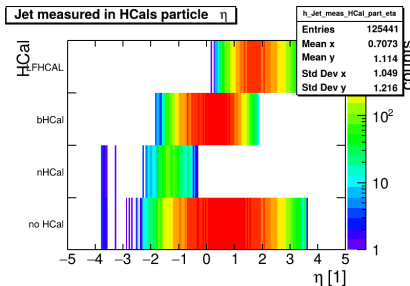
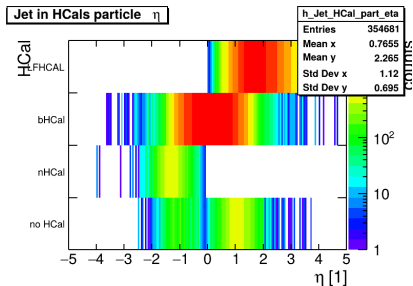
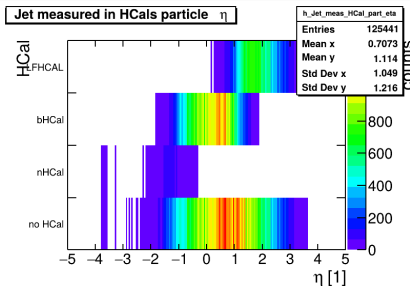
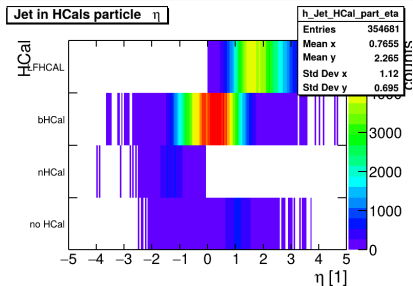
- Full simulation and reconstruction
- Using a few month old container - need to update
- First look at reconstructed jets
- 33k events



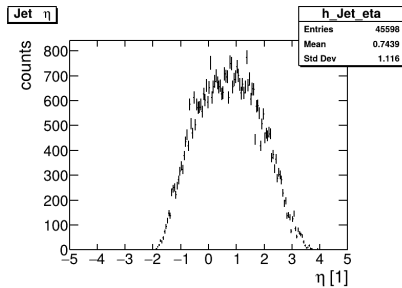
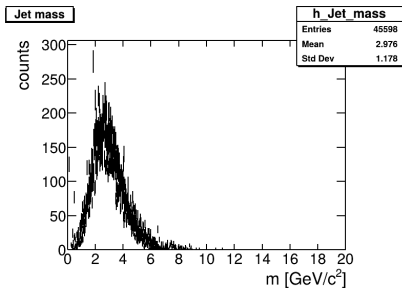
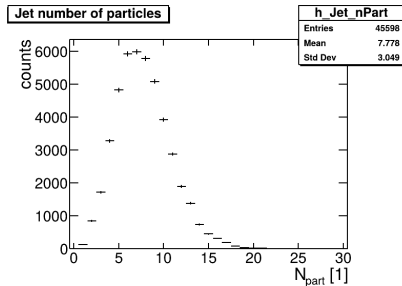
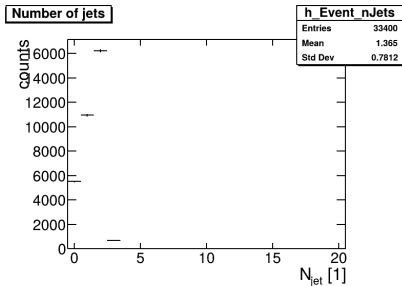
- First look at diffractive dijet events
- 33 final state particles on average

- Reconstructed particles
- Anti- k_T algorithm seems to work well, IR and collinear safe
 - - $d_{ij} = \min\left(\frac{1}{p_{Ti}^2}, \frac{1}{p_{Tj}^2}\right) \frac{\Delta R_{ij}^2}{R^2}$
 - $d_{iB} = \frac{1}{p_{Ti}^2}$
- $R = 1$
- Jet $p_T > 4 \text{ GeV}$
- Sorted jets vs. p_T
- Jet types:
 - MC particle jet
 - Reconstructed particle jet
 - Reconstructed particle jet+nHCal cluster with no matching track
- Used Derek's code to check track-cluster matching
 - <https://github.com/eic/snippets/tree/main/Calorimetry/MatchClustersToTrackProjections>

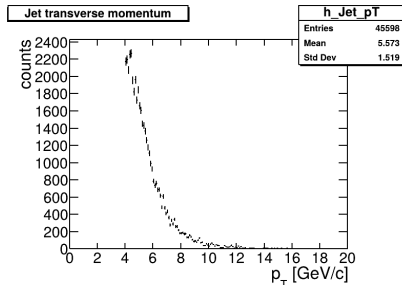
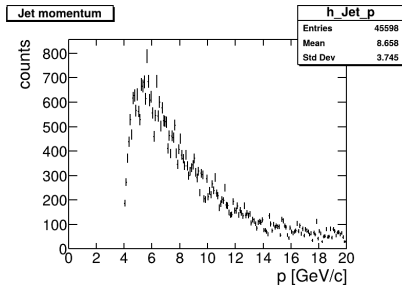
Jets in HCals vs. constituent η



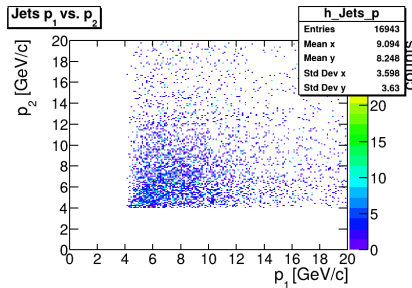
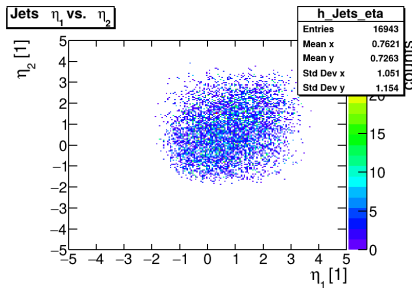
- η distributions for constituents of jets in HCals



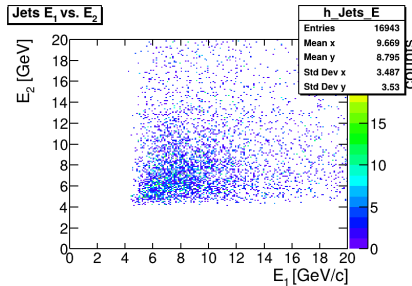
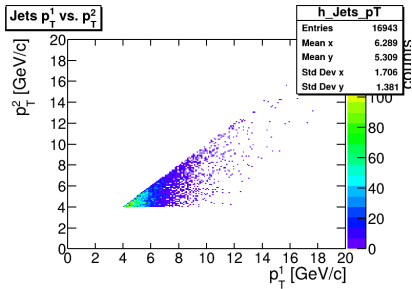
- All jets



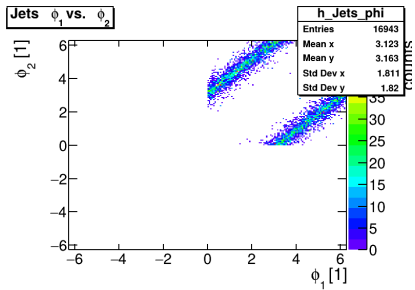
- All jets



- All jets

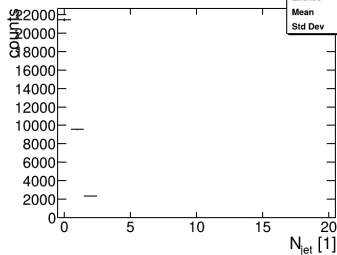


- All jets

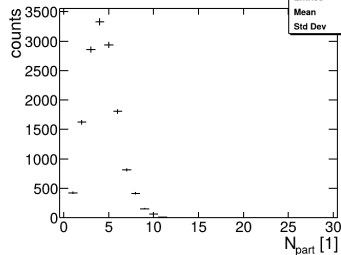


- All jets

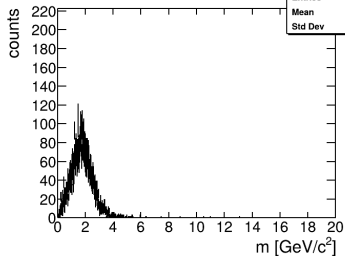
Number of measured jets



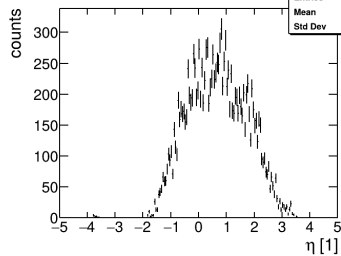
Jet measured number of particles



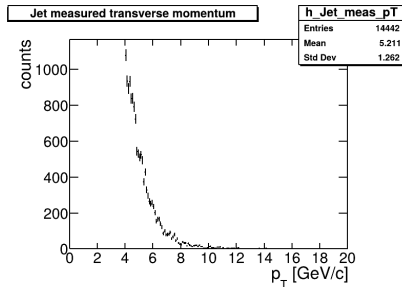
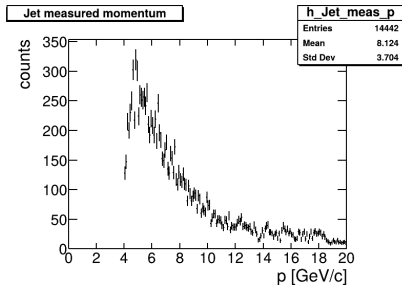
Jet measured mass



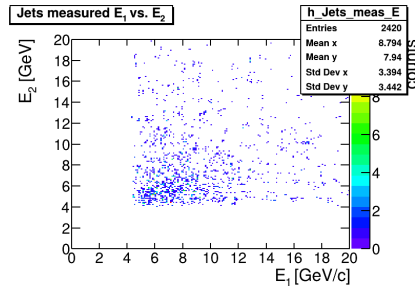
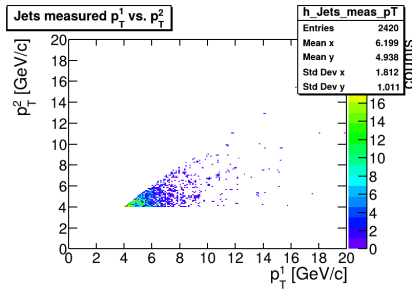
Jet measured η



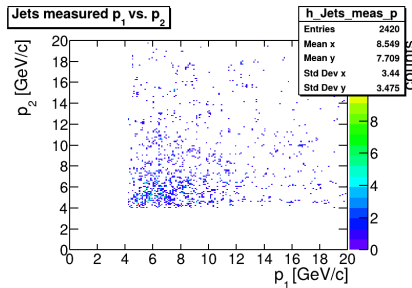
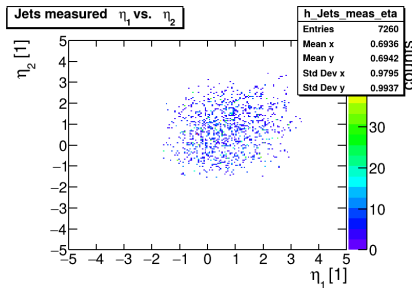
- Measured jets



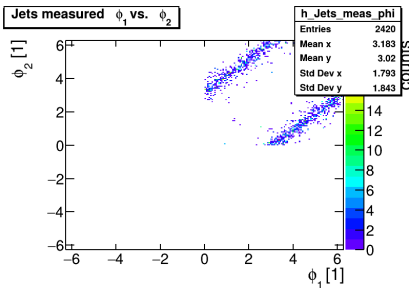
- Measured jets



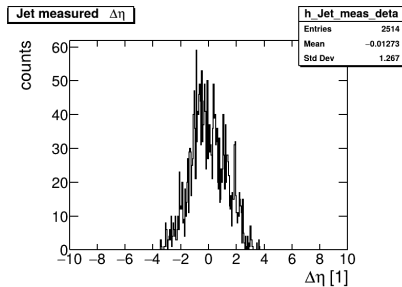
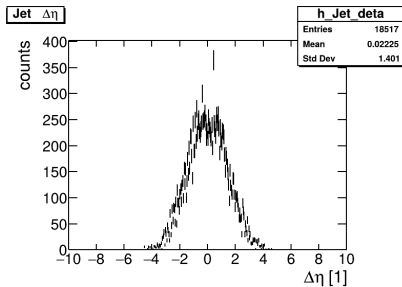
- Measured jets



- Measured jets

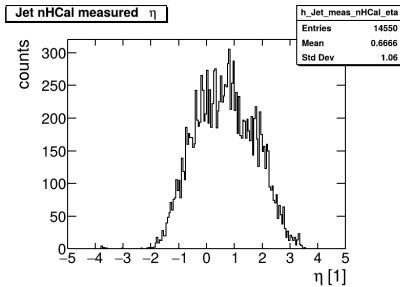
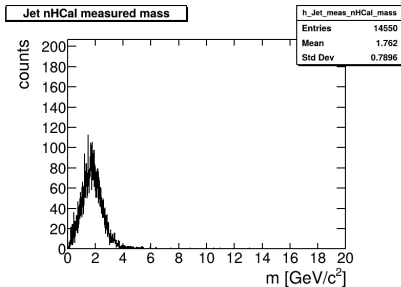
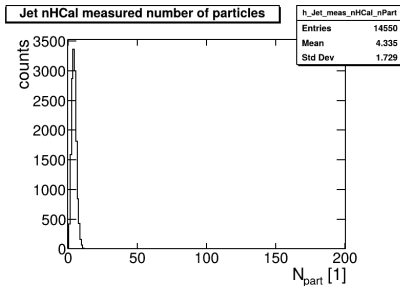
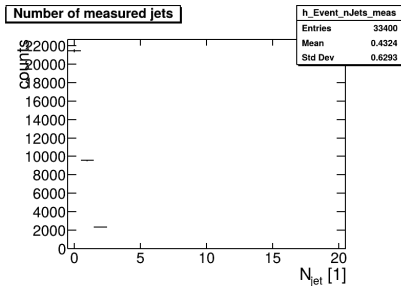


- Measured jets

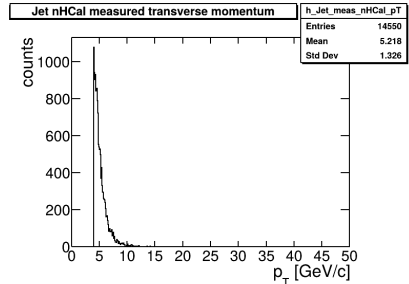
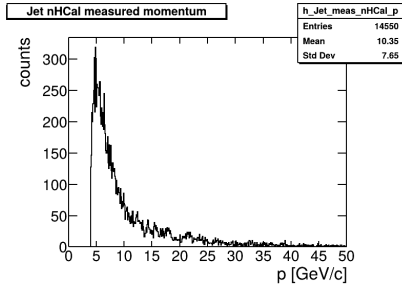


- All jets vs. measured

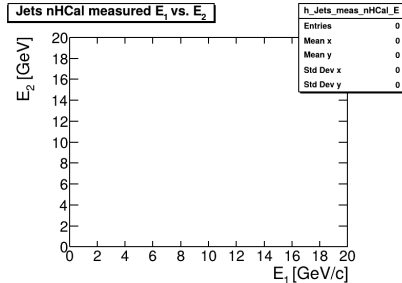
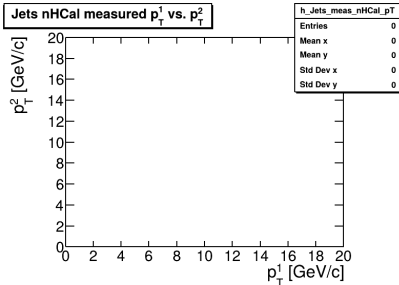
Jets measured with neutrals in nHCal



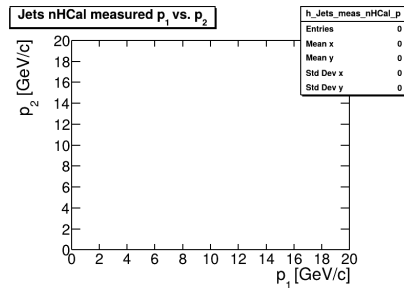
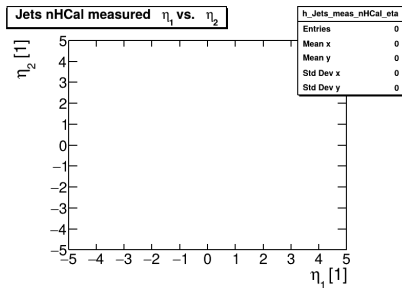
- Measured jets



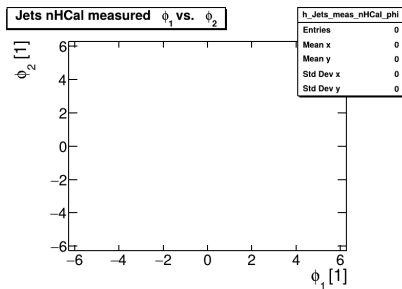
- Measured jets with neutrals in nHCal



- Measured jets with neutrals in nHCal



- Measured jets with neutrals in nHCal

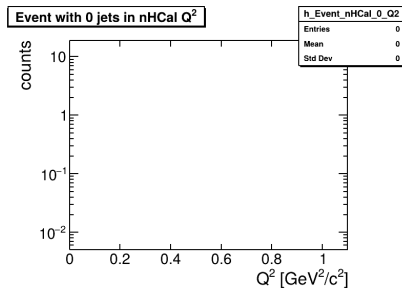
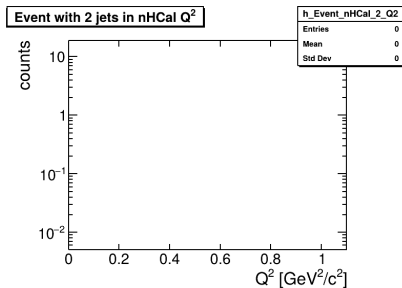
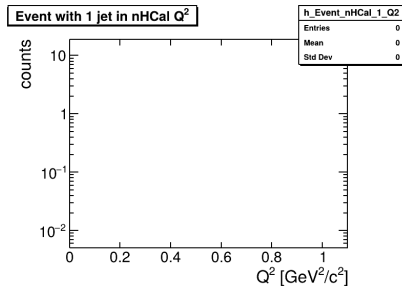
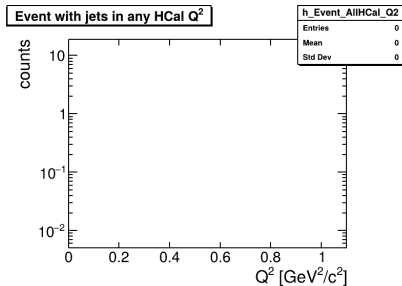


- Measured jets with neutrals in nHCal

Conclusions

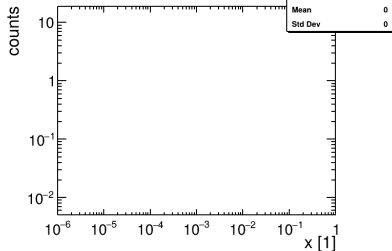
- Implemented FastJet
- First look at jets

BACKUP

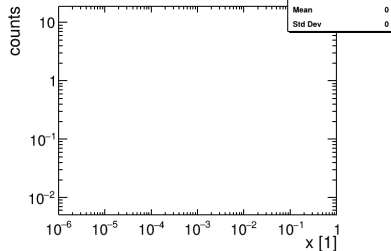


- All events

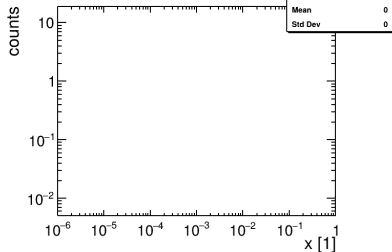
Event with jets in any HCal x



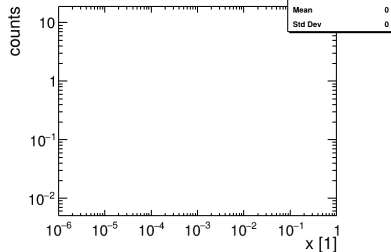
Event with 1 jet in nHCal x



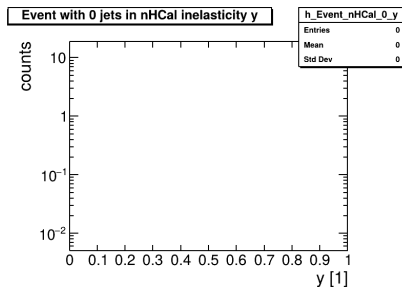
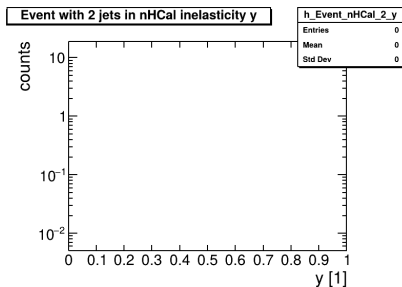
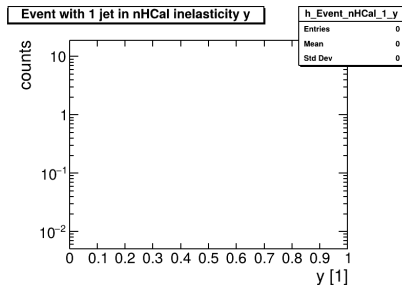
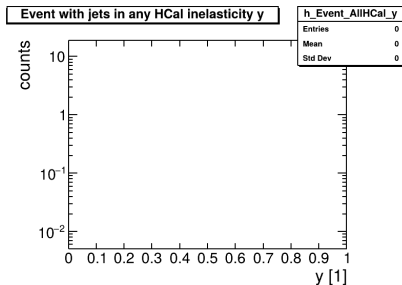
Event with 2 jets in nHCal x



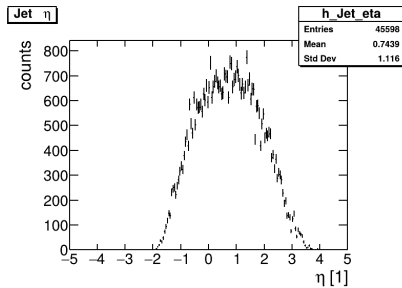
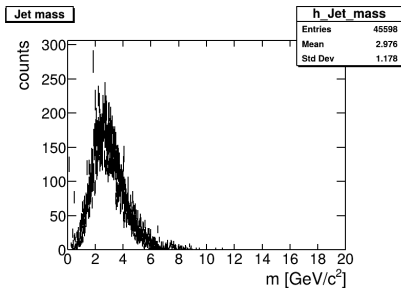
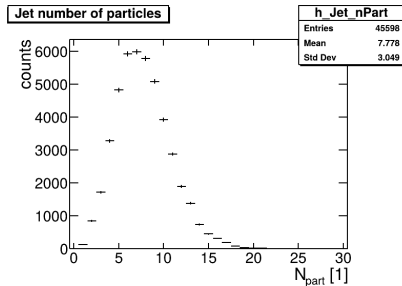
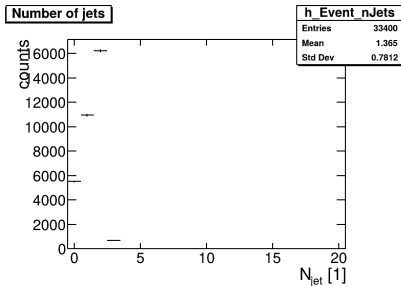
Event with 0 jets in nHCal x



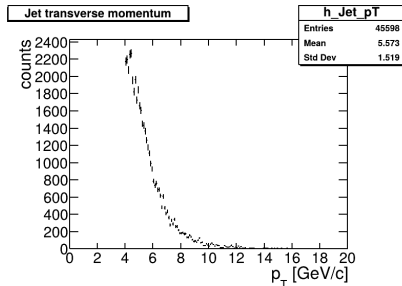
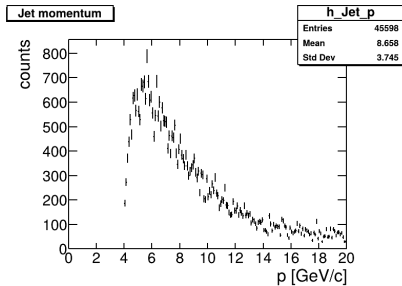
- All events



- All events



- All jets



- All jets