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Data sample

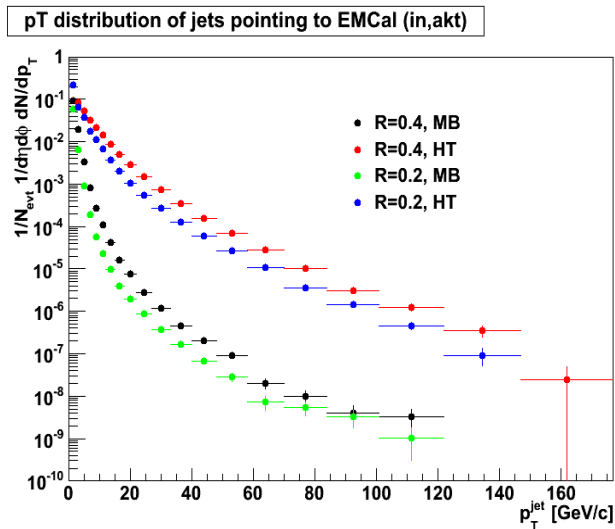
- LHC11a/pass2: 2.76TeV pp run
- Vertex selection
 - ◆ # of contributors > 0
 - ◆ Abs(vz) < 10cm
- Statistics
 - ◆ MB: 24.24M after vertex selection: 19.34M
 - ◆ HT: 5.09e+05, after vertex selection: 4.54e+05
- NEvents used for normalization below are the ones after vertex selection.

Jet spectra

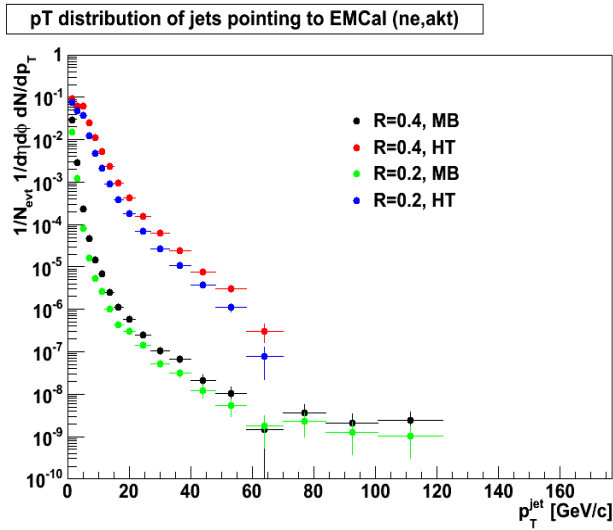
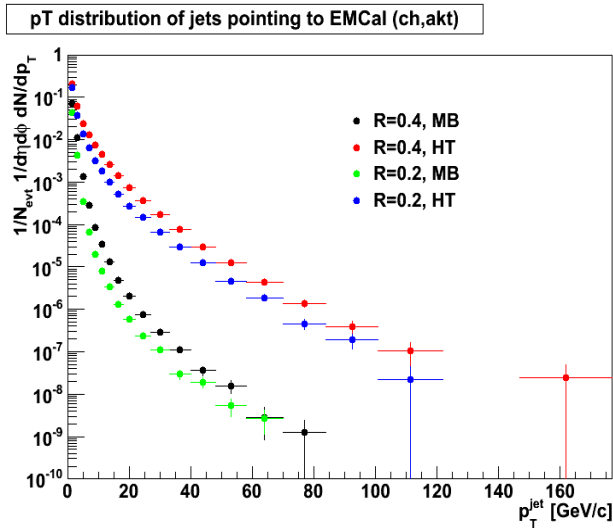
- Configuration
 - ◆ Kinematic cuts: $0.15 < \text{track } p_T < 40$, $0.15 < \text{cluster } E_t < 50$
 - ◆ No NEF cut
 - ◆ No energy double counting correction
 - ◆ No bkg subtraction

Jets pointing to EMCal (no fiducial cut)

- anti-kt algorithm
- Jets with full energy

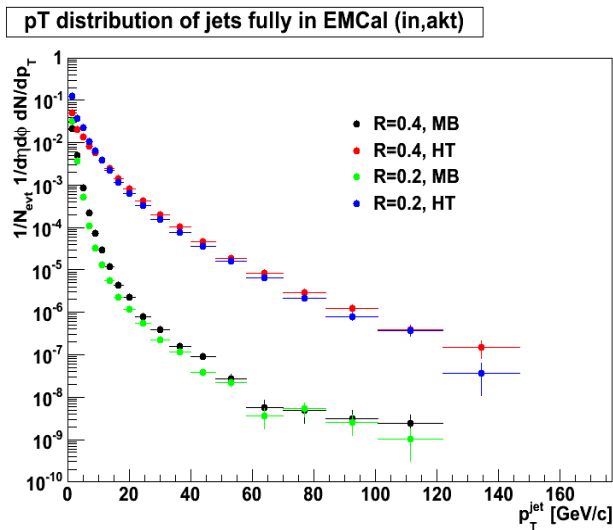


- Jets with charged only energy (left) and neutral only energy (right). In the right plot, a tail for MB distribution shows up, which may suggest noise in EMCal. But why this noise does not show up in the HT distribution???



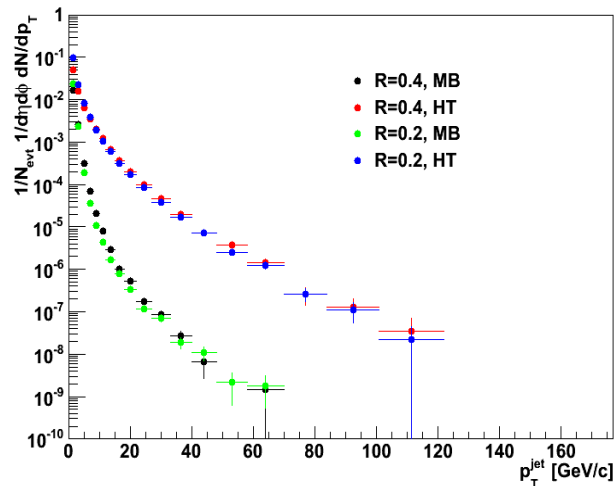
Jets fully in EMCAL acceptance

- anti-kt algorithm
- Jets with full energy

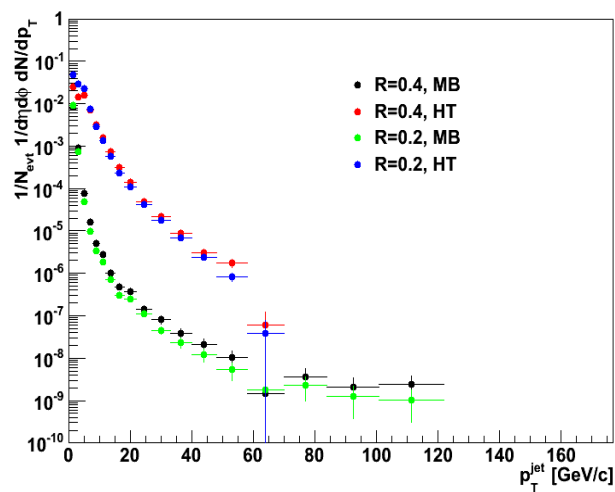


- Jets with charged only energy (left) and neutral only energy (right).

pT distribution of jets fully in EMCal (ch,akt)



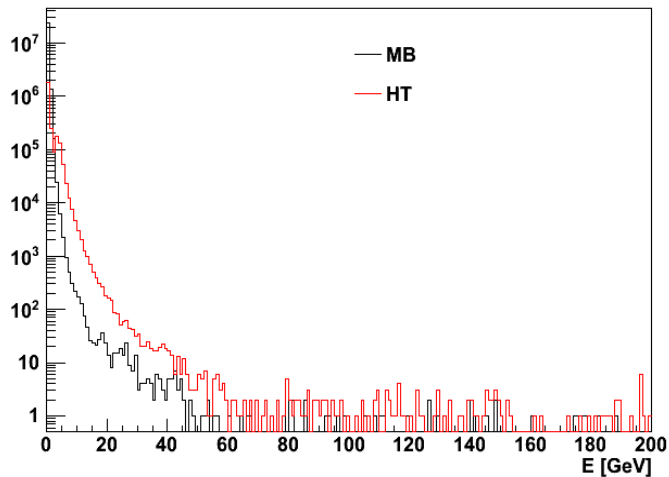
pT distribution of jets fully in EMCal (ne,akt)



Energy distribution of clusters

- In order to investigate the large pT tail of neutral jets in MB events, I plotted the energy distribution of EMCal clusters for both MB and HT as following. Since I applied 50GeV cut on clusters that are feed into jet finder, **one possible cause of the long tail might be the small bumps between 15GeV to 50GeV in MB events**. Need to check the recalibration factors per SM

Energy distribution of EMCal clusters

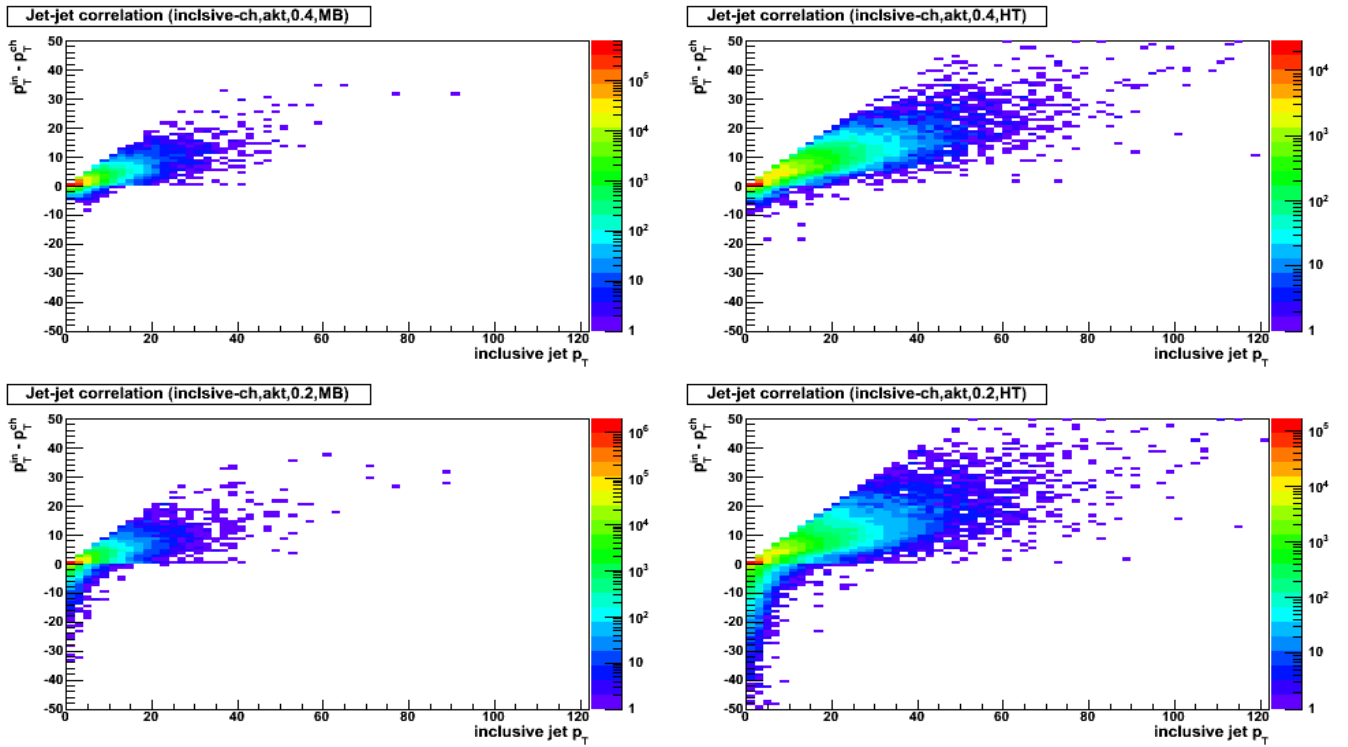


Jet energy difference

- Jet pairs are matched as following:
 - ◆ Find full jets within EMCal acceptance
 - ◆ For each full jet, find the closest charged or neutral jet as matched with cut $dR < 0.25$. Also the charged or neutral jet is required to be fully in EMCal acceptance.

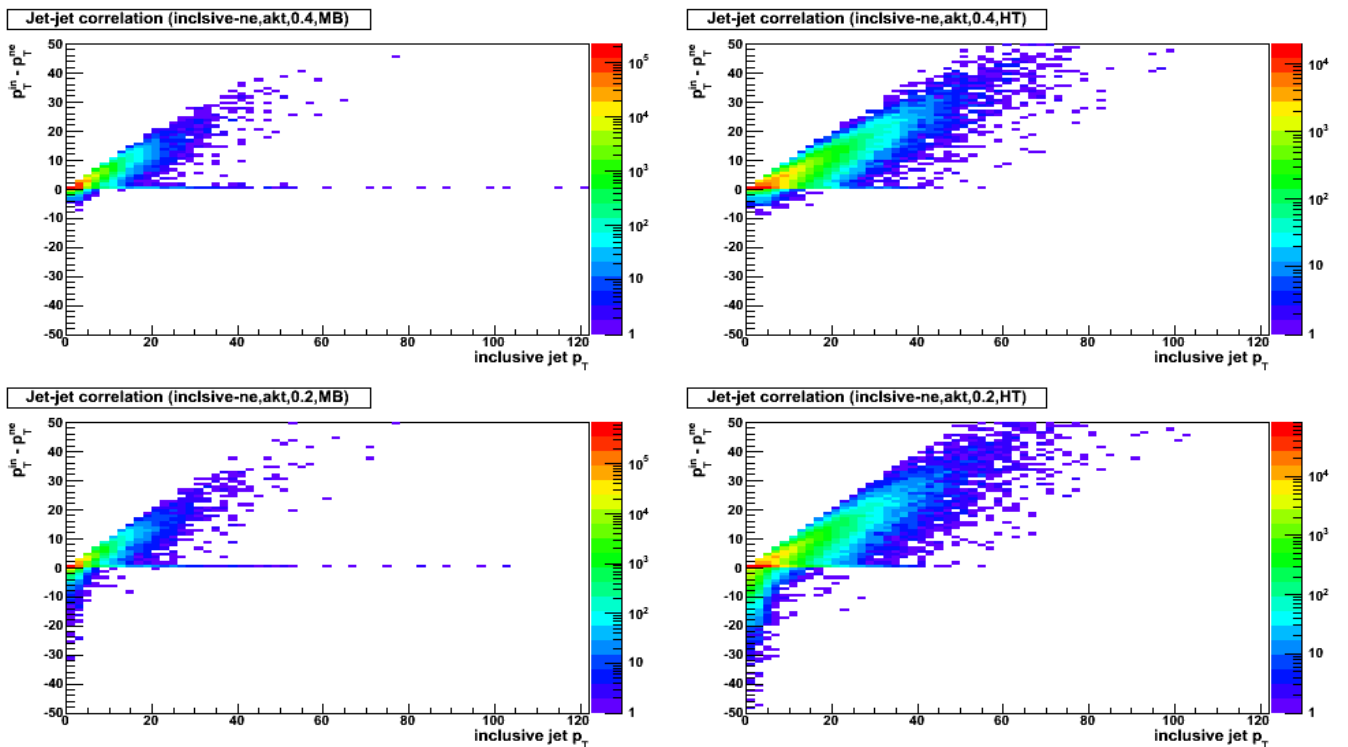
Full jet - charged jet

- (Full jet p_T - charged jet p_T) vs (full jet p_T): anti-kt algorithm
 - ◆ Top left: $R=0.4$, MB
 - ◆ Top right: $R=0.4$, HT
 - ◆ Bottom left: $R=0.2$, MB
 - ◆ Bottom right: $R=0.2$, HT
 - ◆ Some mismatch shows up in $R=0.2$ case, indicating the dR cut should be tighter.



Full jet - neutral jet

- (Full jet p_T - neutral jet p_T) vs (full jet p_T): anti-kt algorithm
 - ◆ Top left: $R=0.4$, MB
 - ◆ Top right: $R=0.4$, HT
 - ◆ Bottom left: $R=0.2$, MB
 - ◆ Bottom right: $R=0.2$, HT



This topic: Main > 2011-07-06

Topic revision: r3 - 2011-11-24 - RongrongMa



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