1st look at the events with rapidity gaps

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Gap Triggers

- **Dedicated gap triggers in the DØ trigger list:**
  - **JT_25TT_Gap**
    - **JT25TT requires:**
      - **at L1 – 2 calorimeter jet towers with $E_T > 5$ GeV**
      - **at L3 – simple cone jet above 25 GeV**
    - **Gap:**
      - **an be GAPN (-□, Aside), GAPS (+□, Pside), GAPSN (both) or NG (none)**
  - **Also have zero_bias_Gap triggers for this study**

- **Starting to look at data to determine what gaps look like in the RunII calorimeter**

- **Compare diffractive jets to inclusive jets**

- **From RunI, expect Gap events to be quieter (less energy in forward region), with fewer and narrower jets than inclusive sample**

Data sample

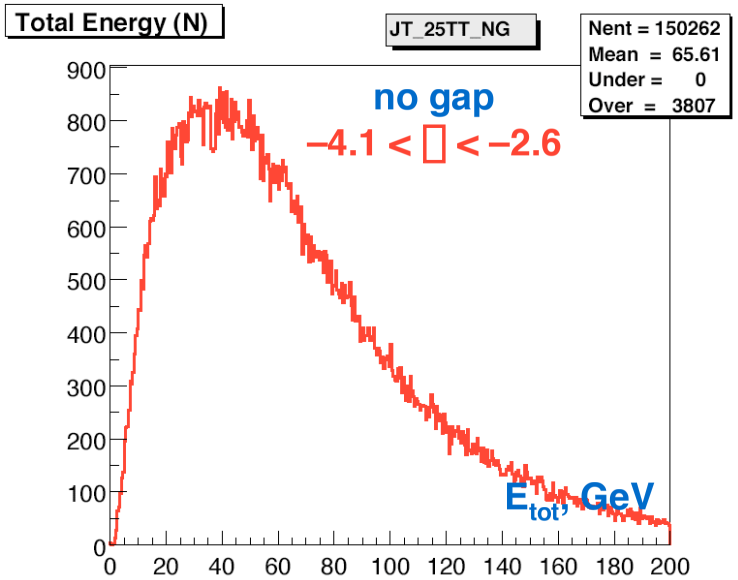
- **Sample properties:**
  - reconstructed with p13.05.00
  - jet triggers: JT_25TT_NG, JT_25TT_GN, JT_25TT_GS, JT_25TT_GSN
  - 0 bias triggers: zero_bias, zero_bias_GN, zero_bias_GS, zero_bias_GSN, min_bias
  - global trigger version: CMT-9.20, CMT-9.20

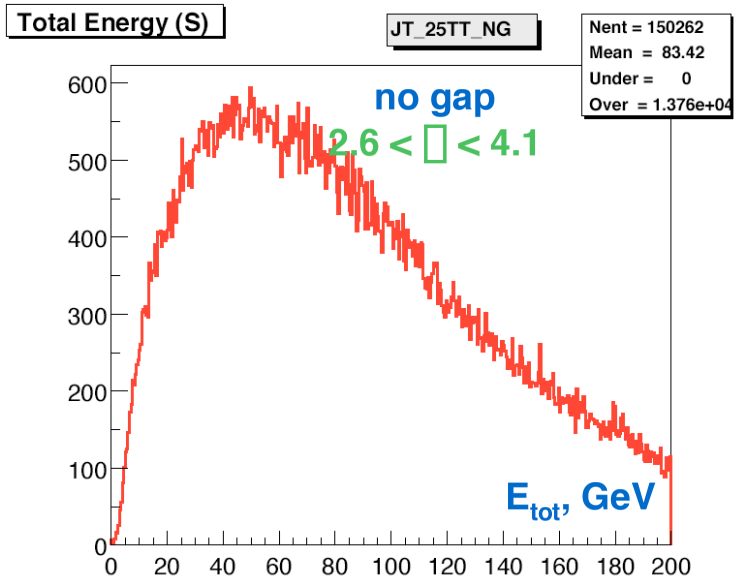
- **Event selection:**
  for sample with jet triggers:
  - at list 1 primary vertex (PV)
  - at least 5 tracks pointing to the primary vertex
  - $| Z_{PVtx} | < 50$ cm

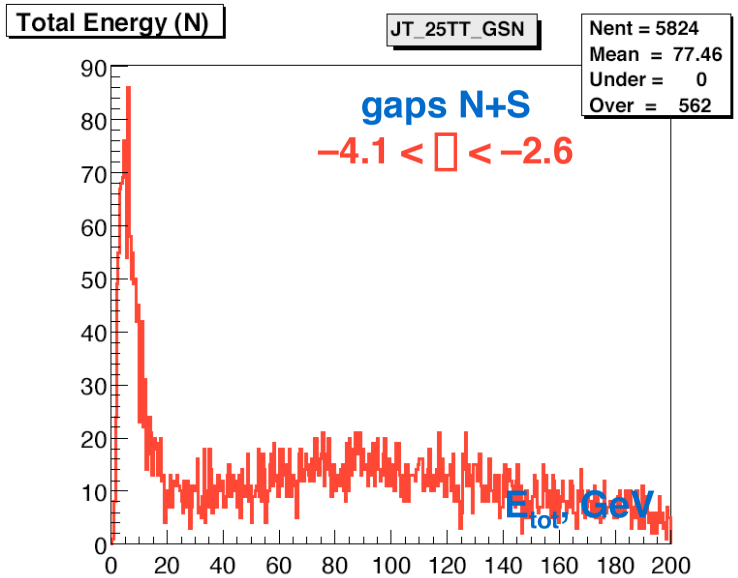
  for sample 0 bias triggers:
  - no primary vertex (PV)

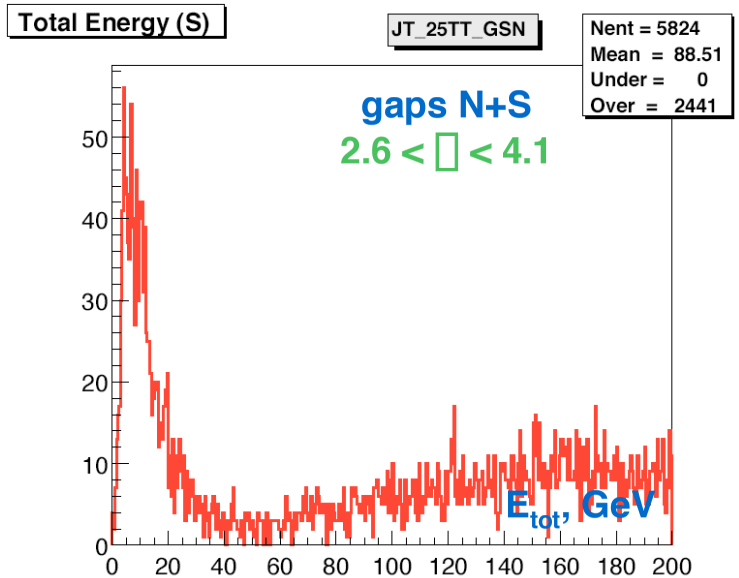
- **Cal. cells selection:**
  - $E_{cell} > 100$ MeV

total energy (2.6 < |η| < 4.1)

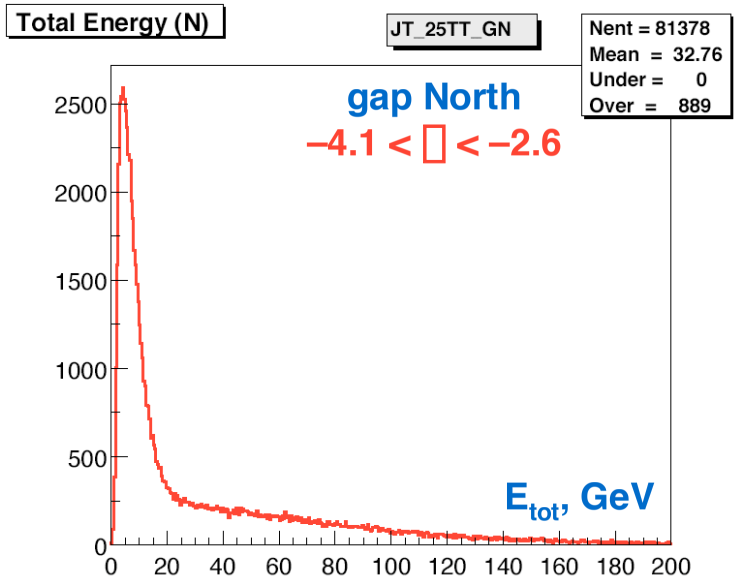


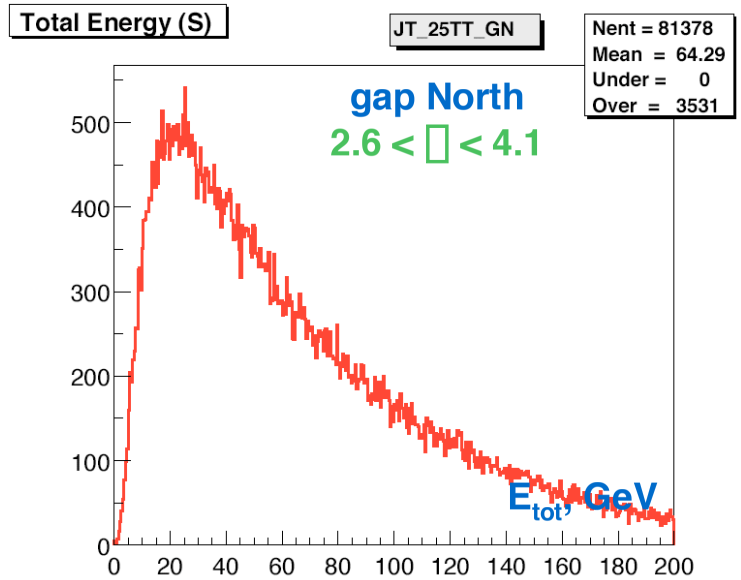


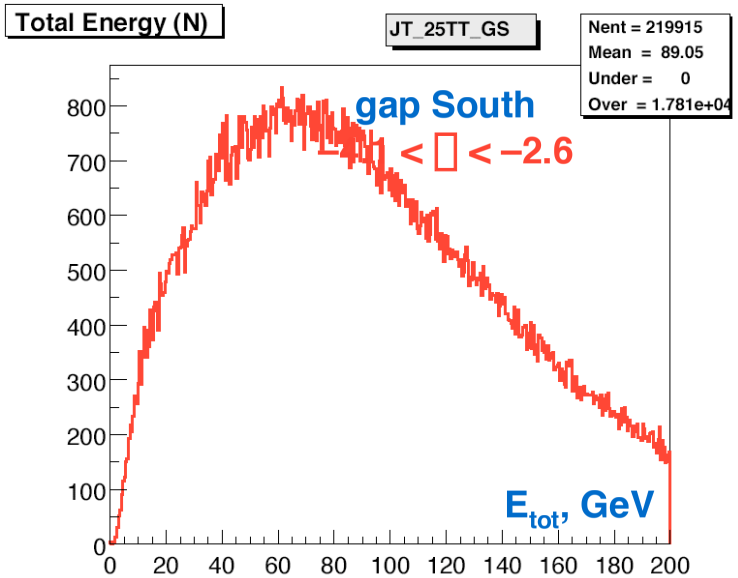


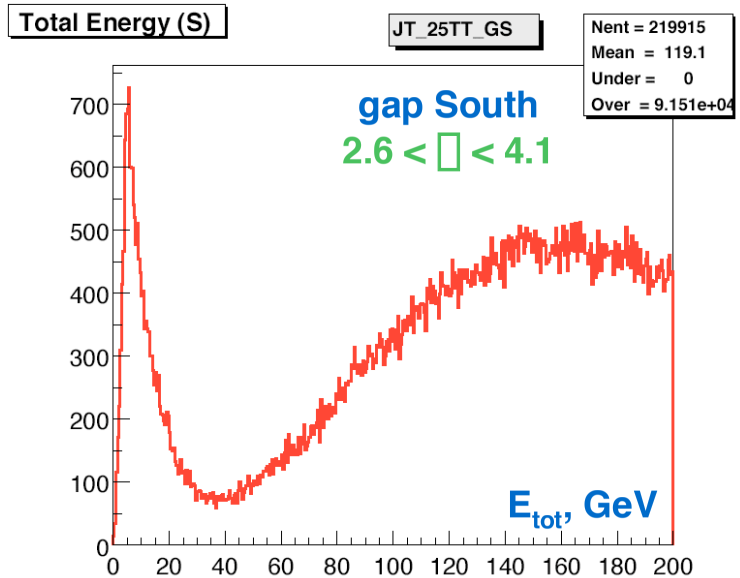


total energy (2.6 < |□| < 4.1)

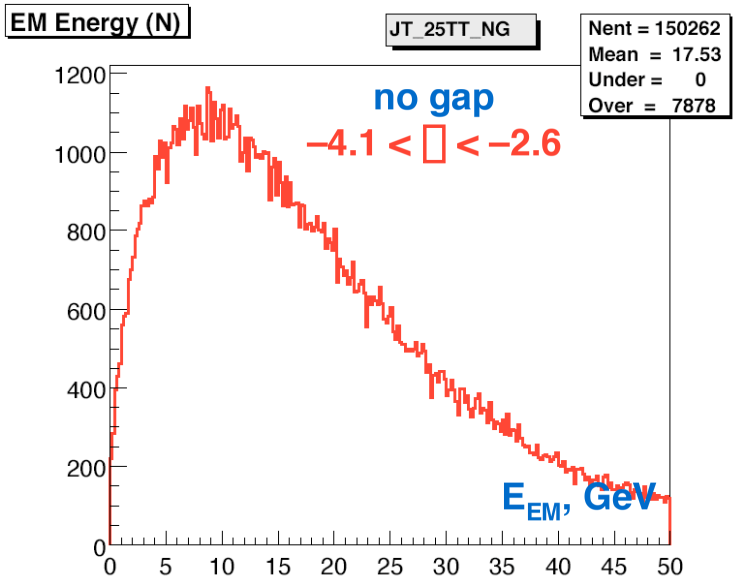


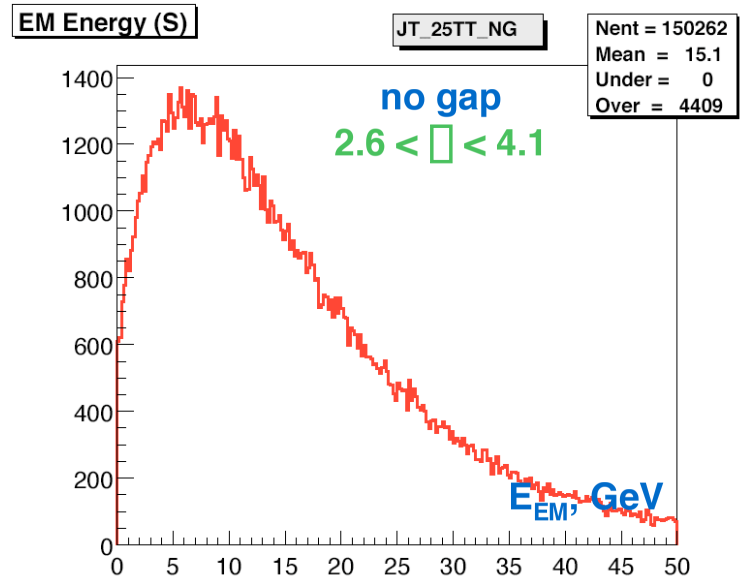


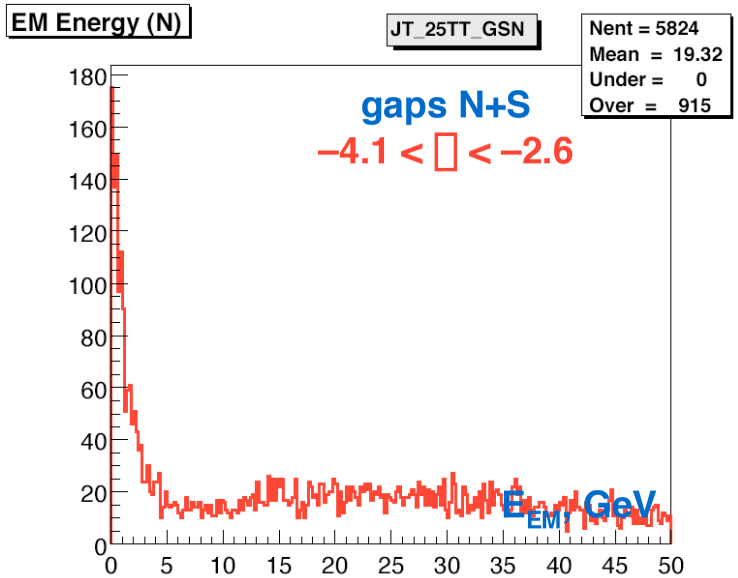


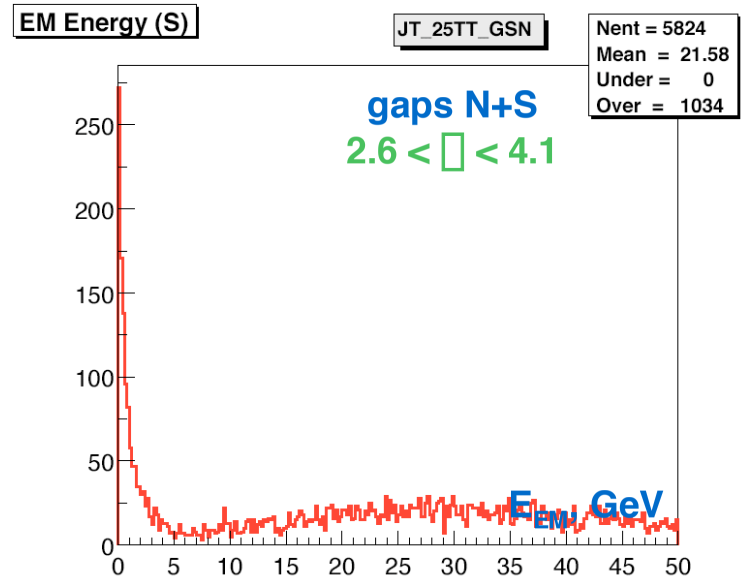


EM energy (2.6 < |□| < 4.1)

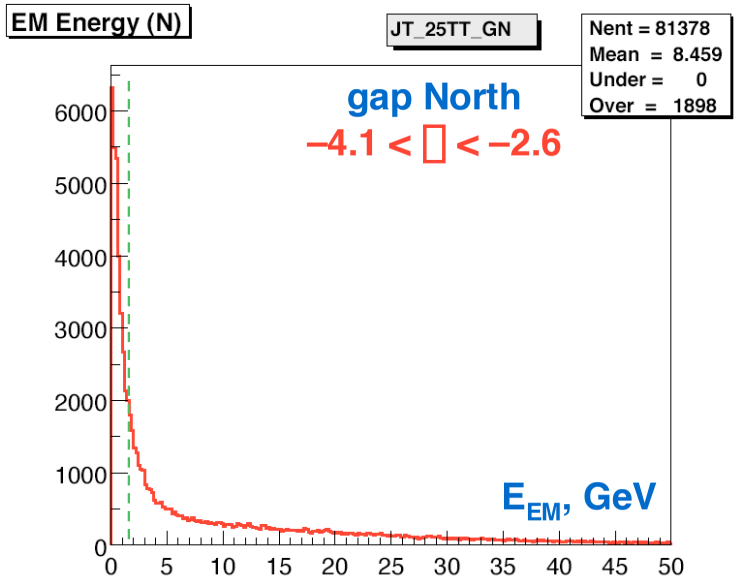


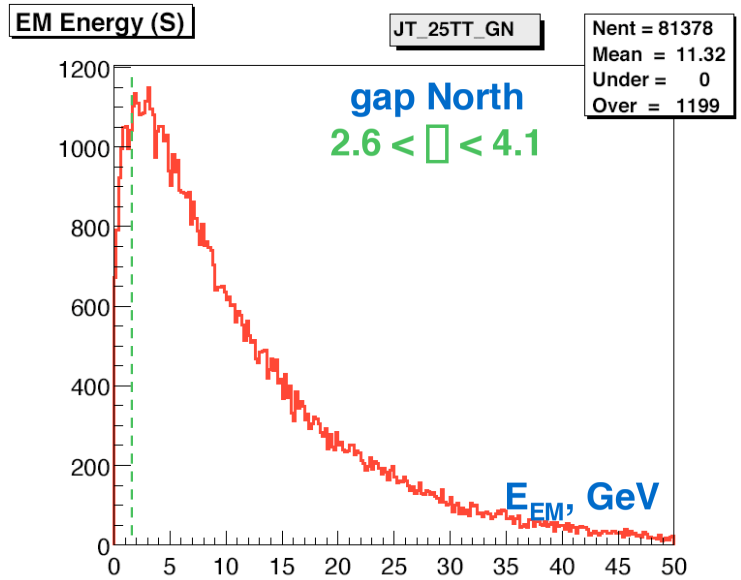


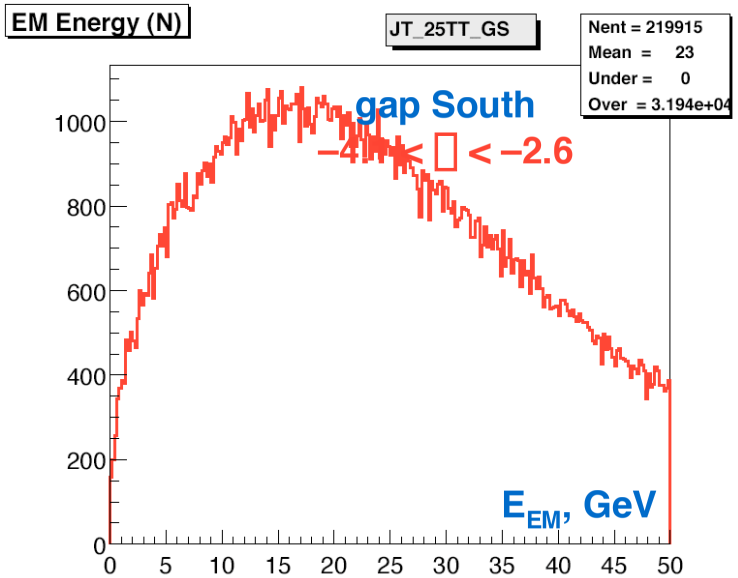


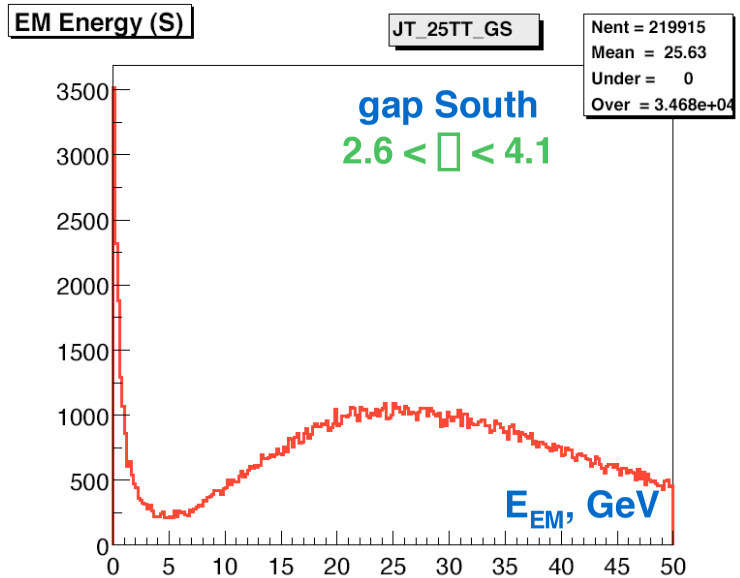


EM energy (2.6 < |□| < 4.1)

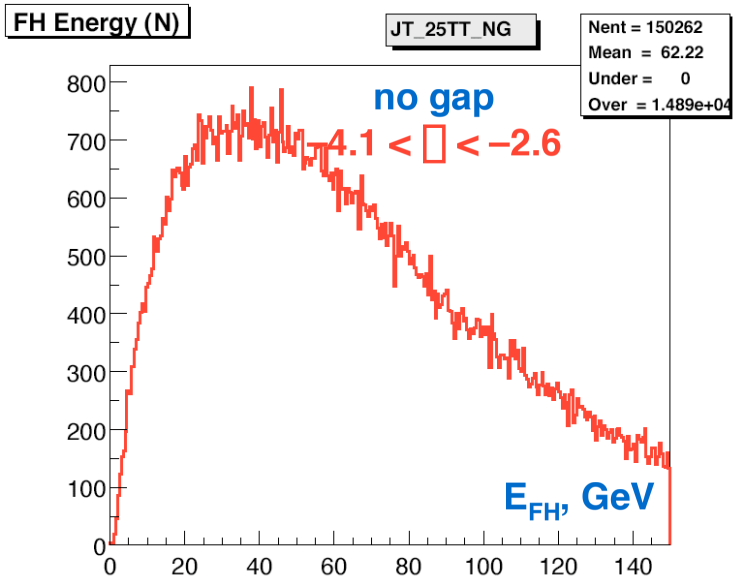


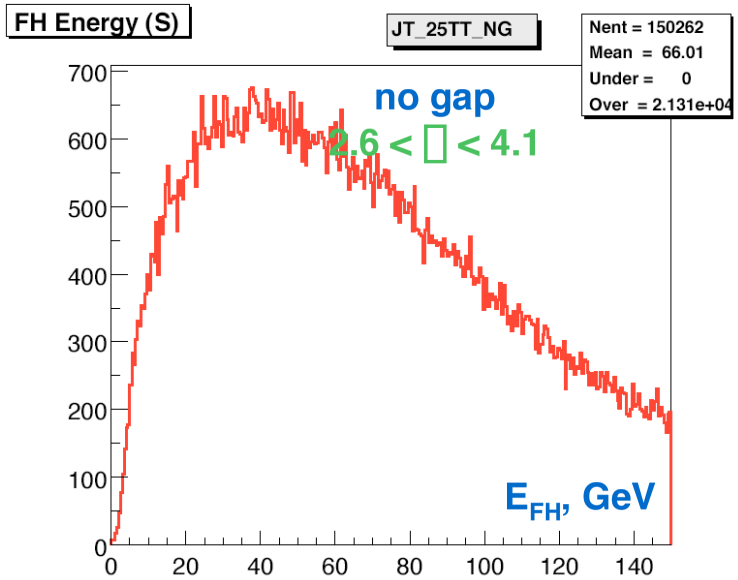


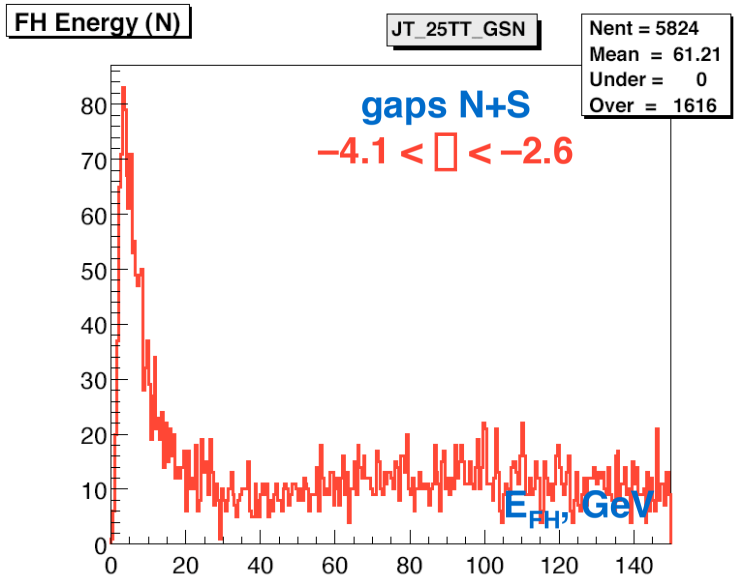


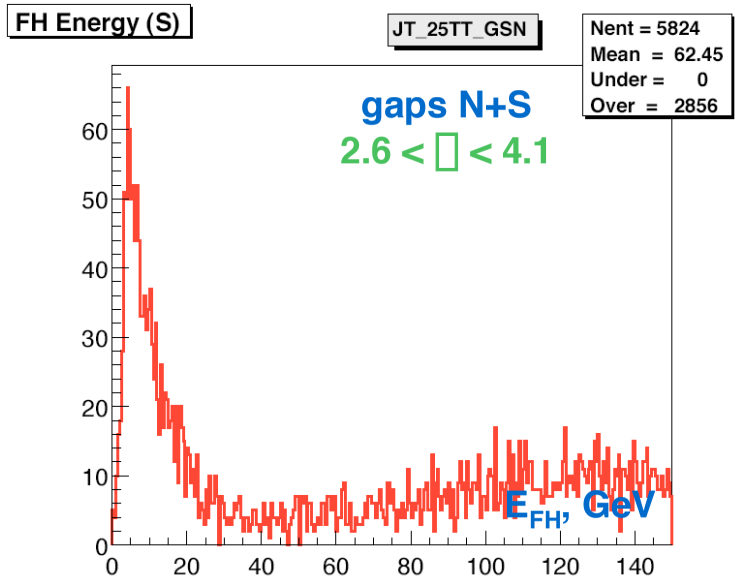


FH energy (2.6 < |η| < 4.1)

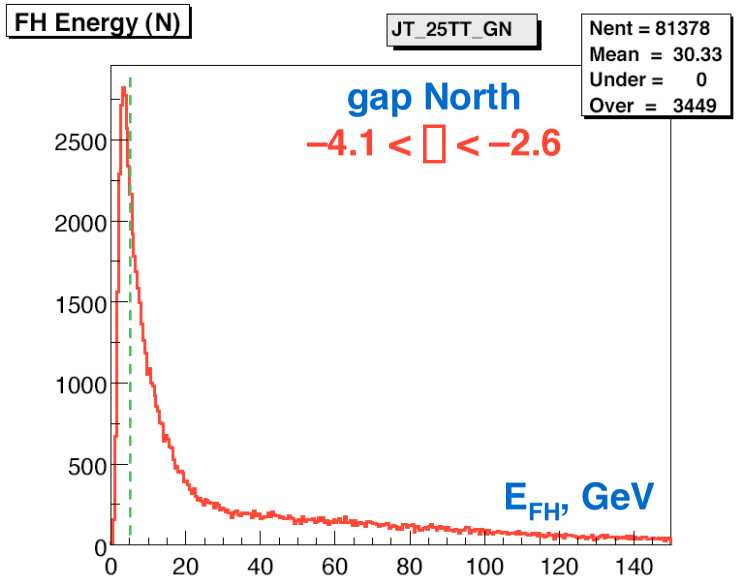


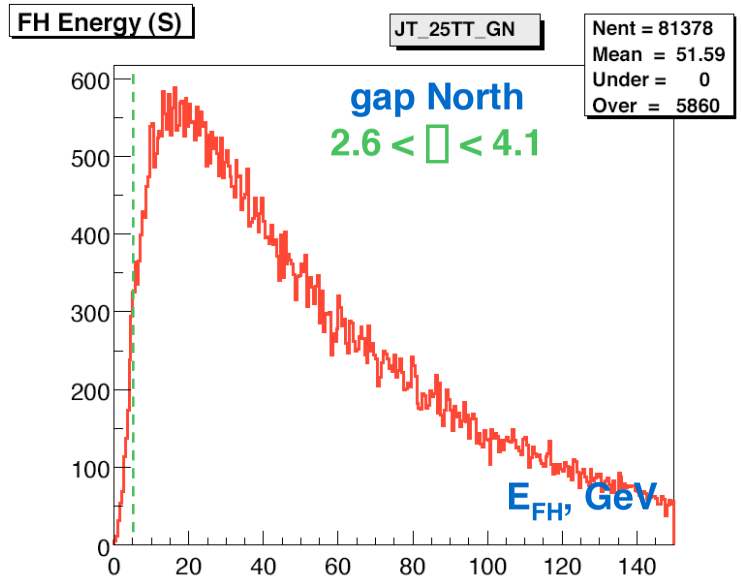


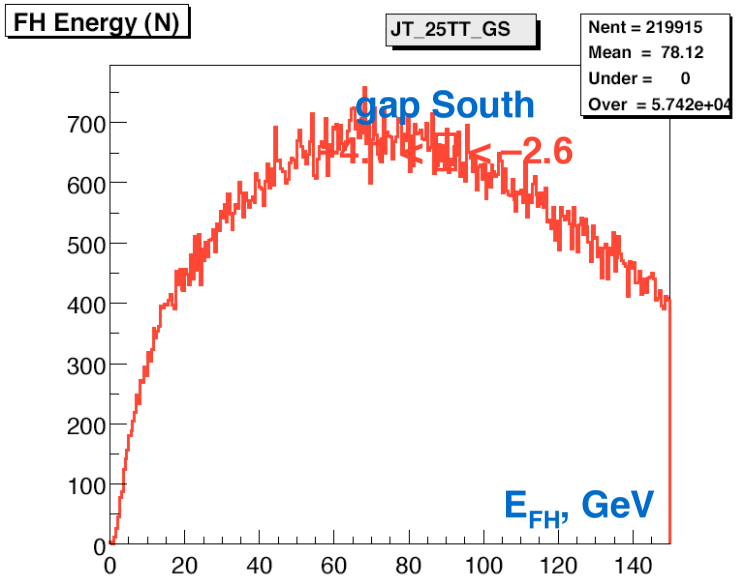


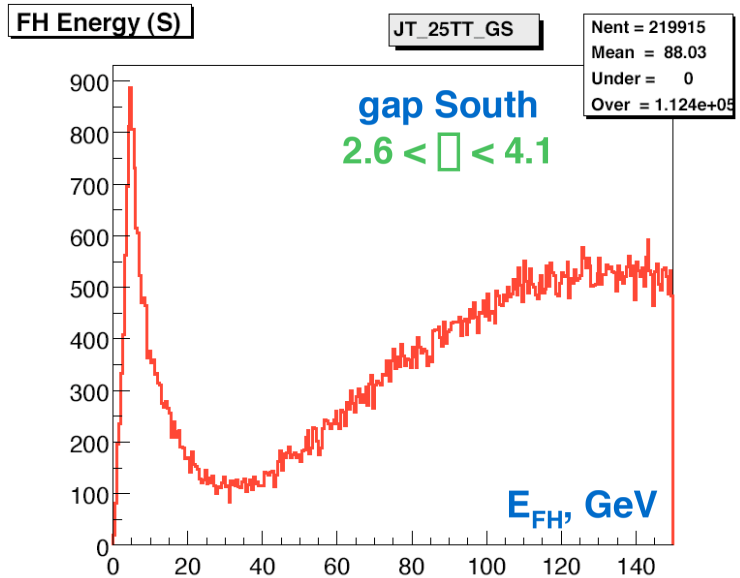


FH energy (2.6 < |□| < 4.1)

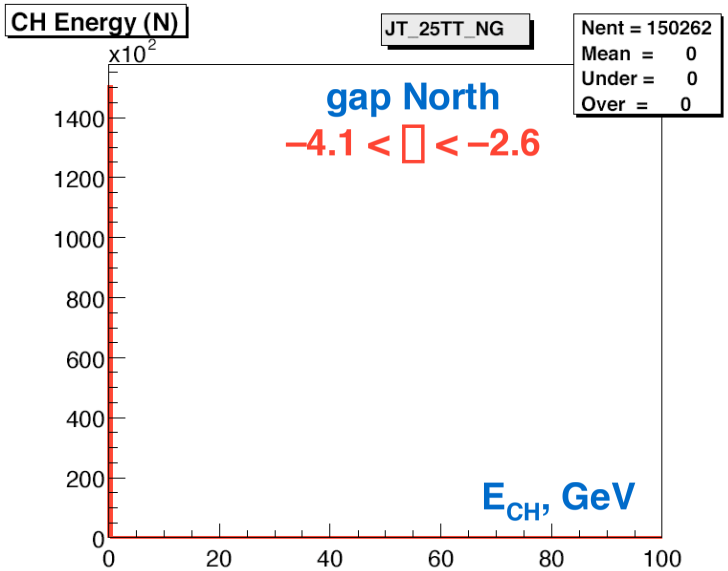






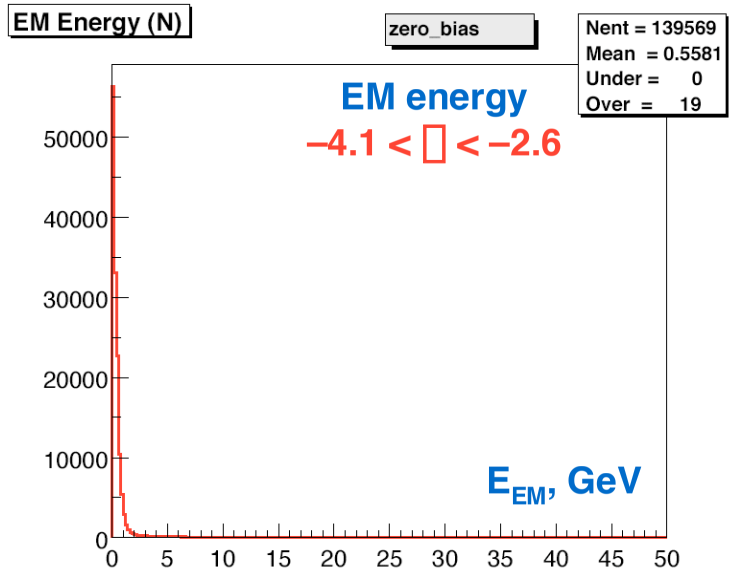


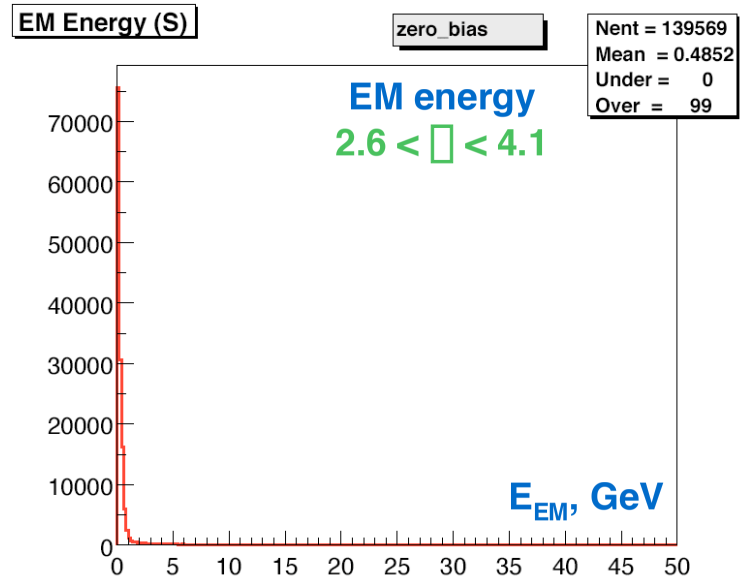
CH energy (2.6 < |□| < 4.1)

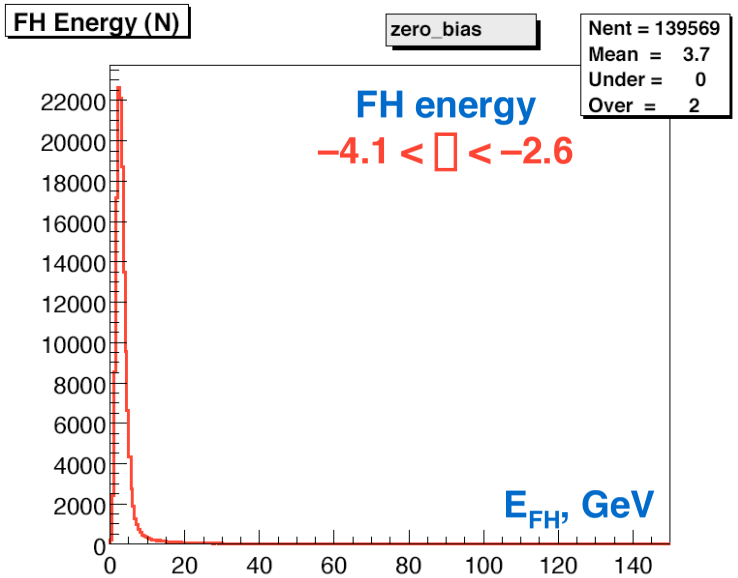


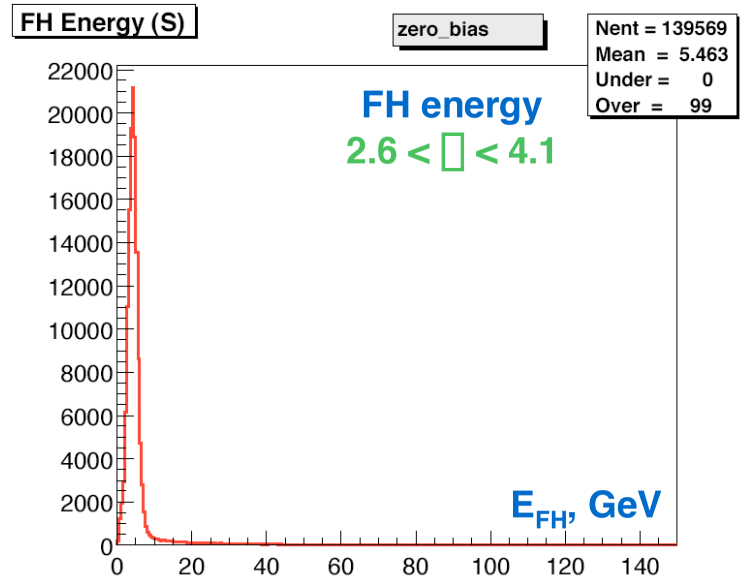
No cal. cells with E_{cell} > 100 MeV

zero_bias trigger







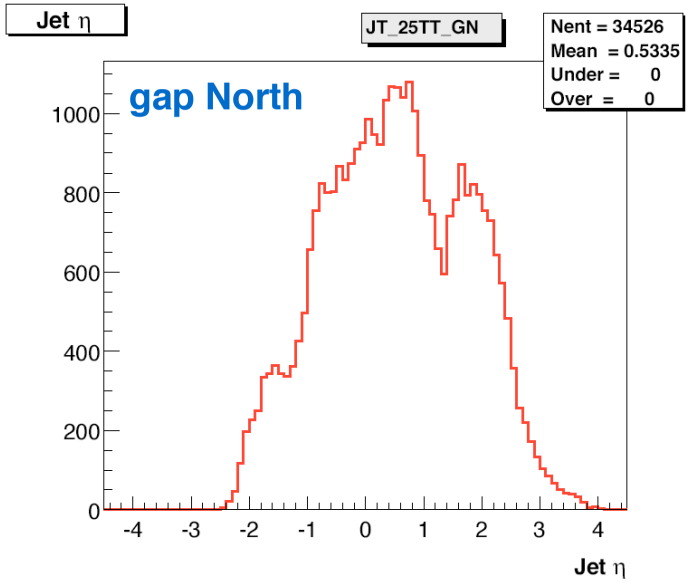


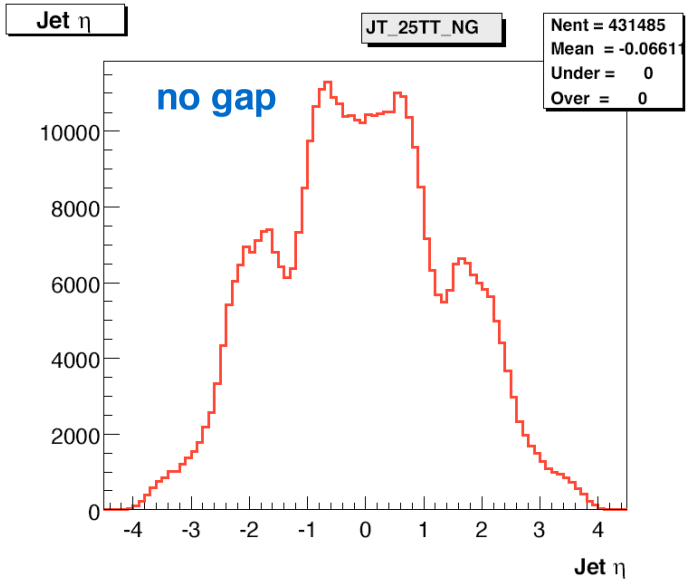
jets in evts with & w/o gaps

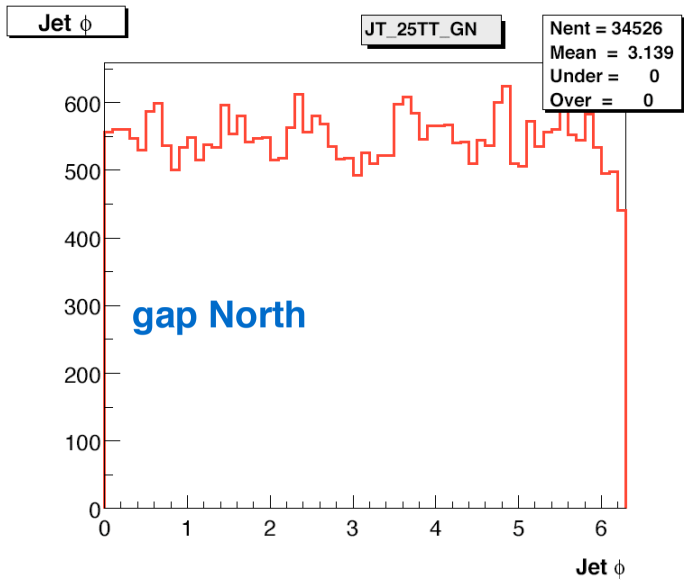
- **Events with gap:**
  - **JT_25TT_GapN**
  - **EM energy (-4.1 < η < -2.6) < 2 GeV**
  - **FH energy (-4.1 < η < -2.6) < 5 GeV**

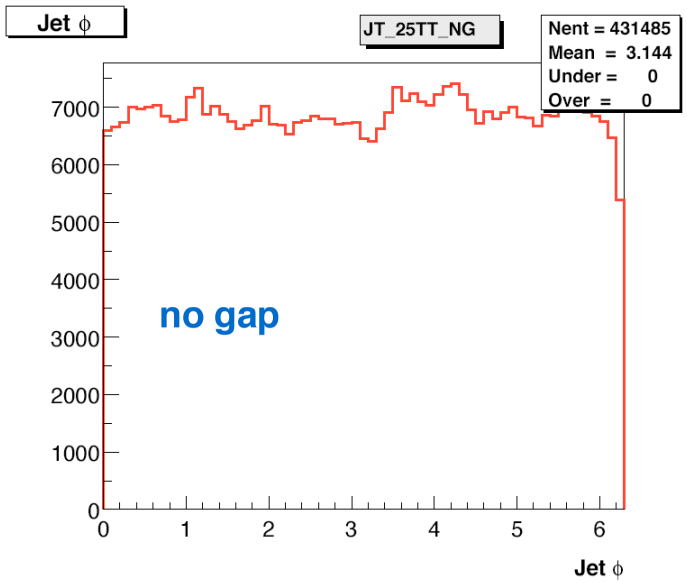
- **Events without gap:**
  - **JT_25TT_NG**
  - **no energy cuts**

jet □ & □ (after jet ID cuts)

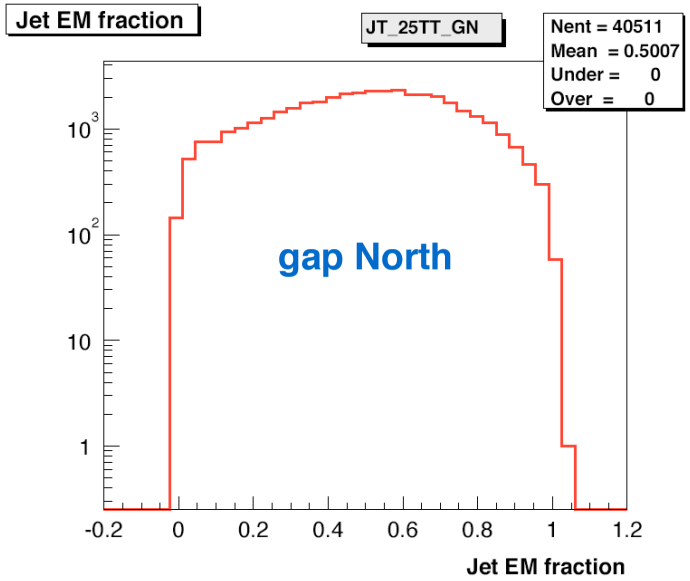


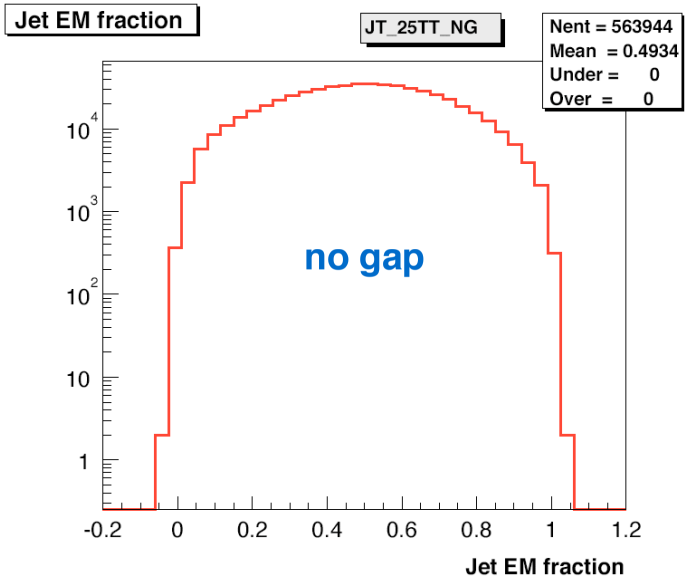


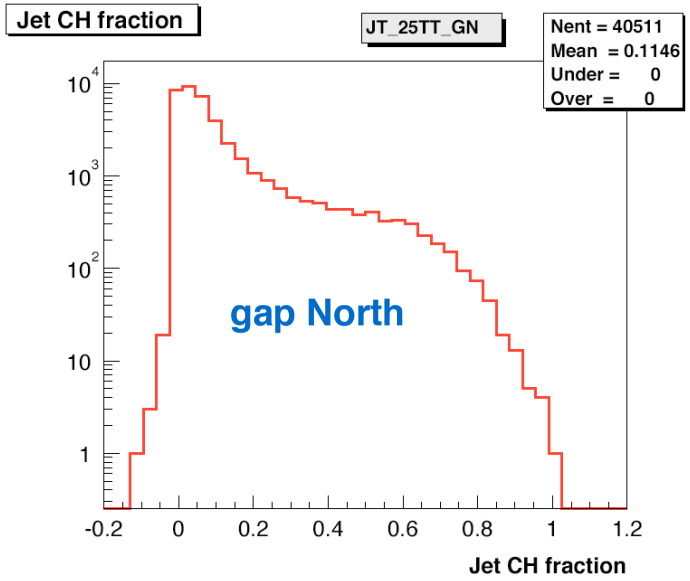


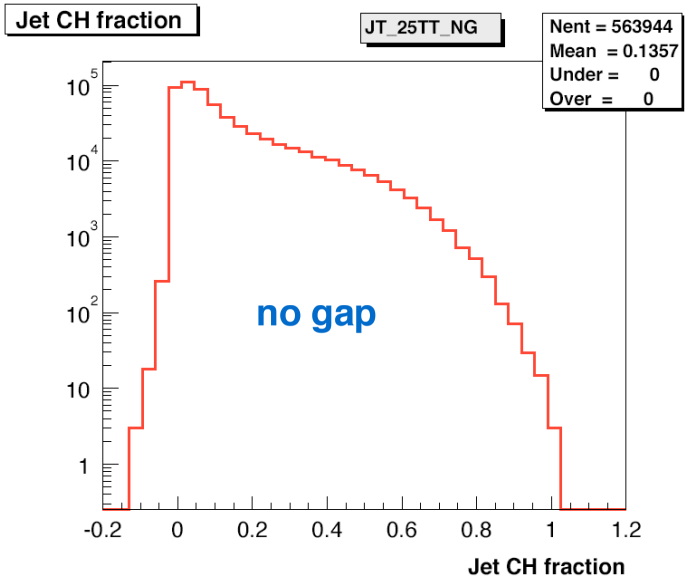


jet EMF & CHF

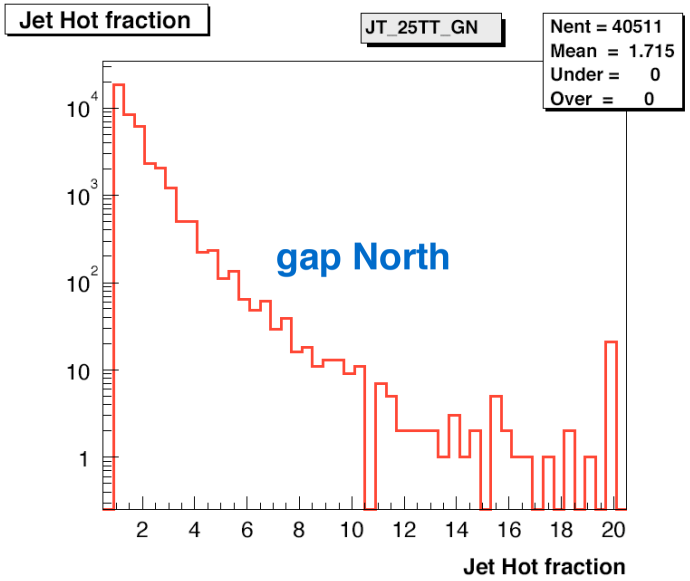

Jet EM fraction
JT_25TT_GN
Nent = 40511
Mean = 0.5007
Under = 0
Over = 0
gap North
Jet EM fraction

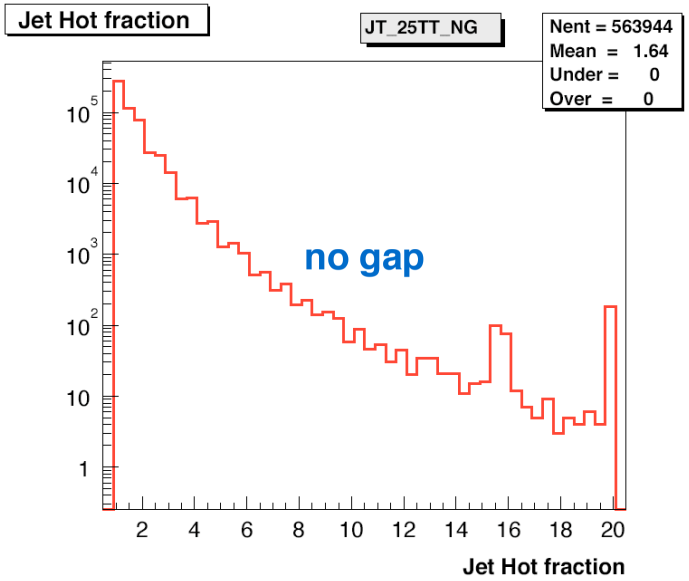

Jet EM fraction
JT_25TT_NG
Nent = 563944
Mean = 0.4934
Under = 0
Over = 0
no gap
Jet EM fraction

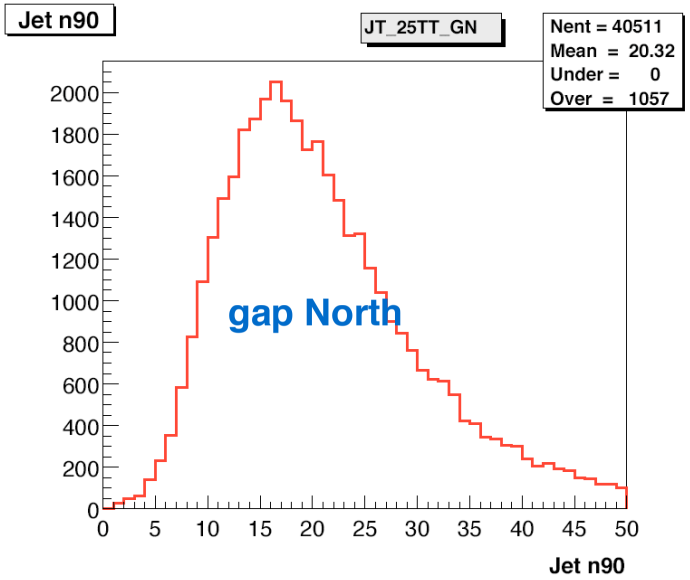

Jet CH fraction
JT_25TT_GN
Nent = 40511
Mean = 0.1146
Under = 0
Over = 0
gap North
Jet CH fraction

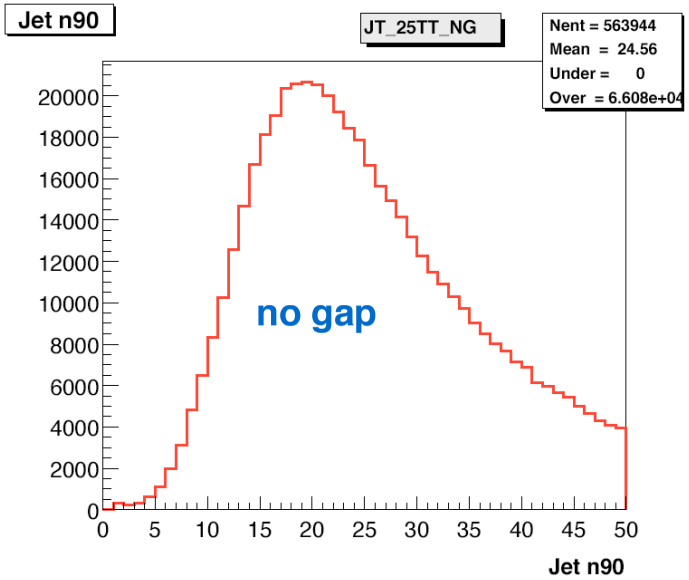

Jet CH fraction
JT_25TT_NG
Nent = 563944
Mean = 0.1357
Under = 0
Over = 0
no gap
Jet CH fraction

jet hotF & n90

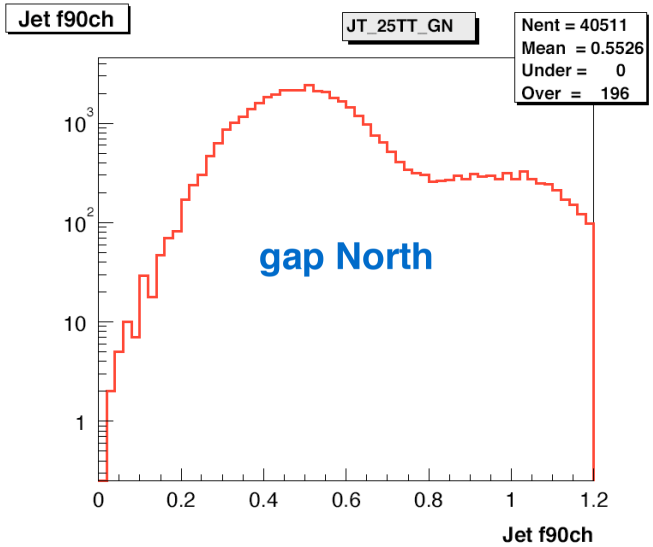

Jet Hot fraction
JT_25TT_GN
Nent = 40511
Mean = 1.715
Under = 0
Over = 0
gap North
Jet Hot fraction

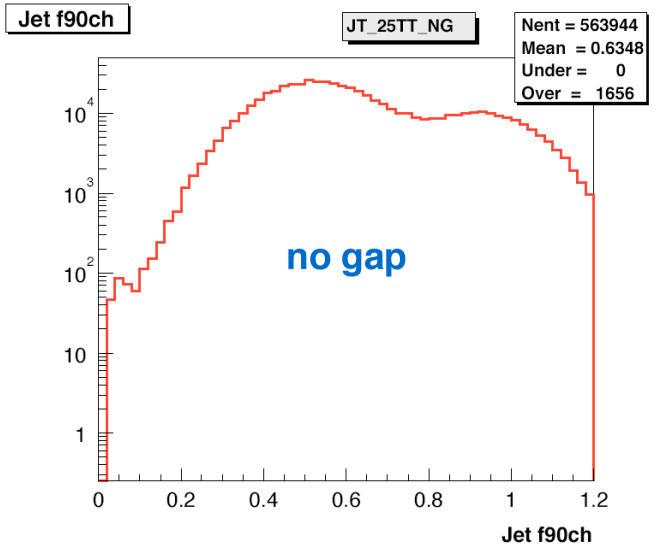

Jet Hot fraction
JT_25TT_NG
Nent = 563944
Mean = 1.64
Under = 0
Over = 0
no gap
Jet Hot fraction


Jet n90
JT_25TT_GN
Nent = 40511
Mean = 20.32
Under = 0
Over = 1057
gap North
Jet n90

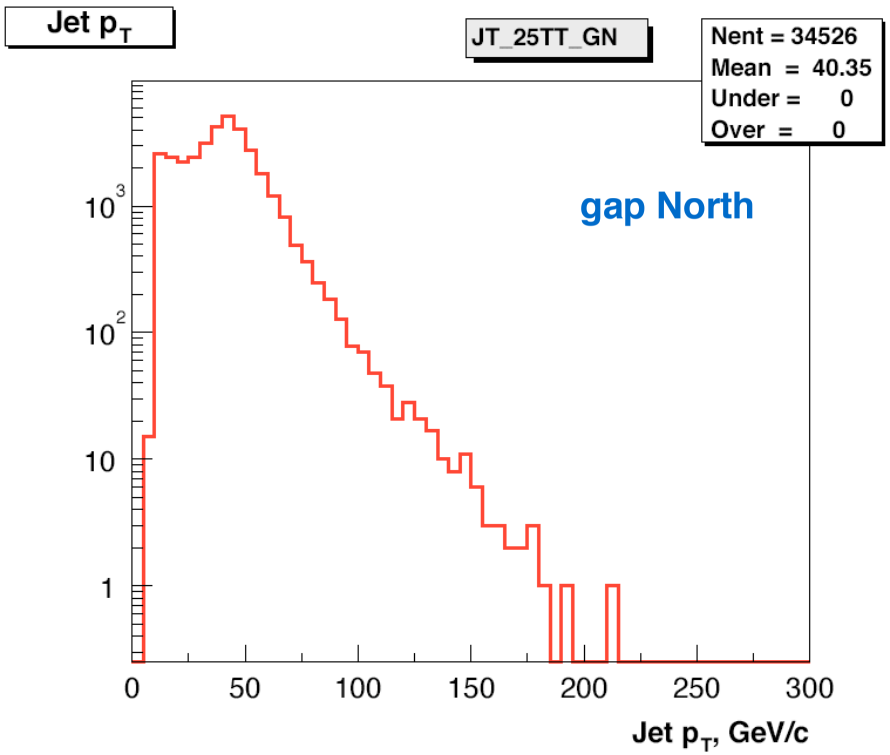

Jet n90
JT_25TT_NG
Nent = 563944
Mean = 24.56
Under = 0
Over = 6.608e+04
no gap
Jet n90

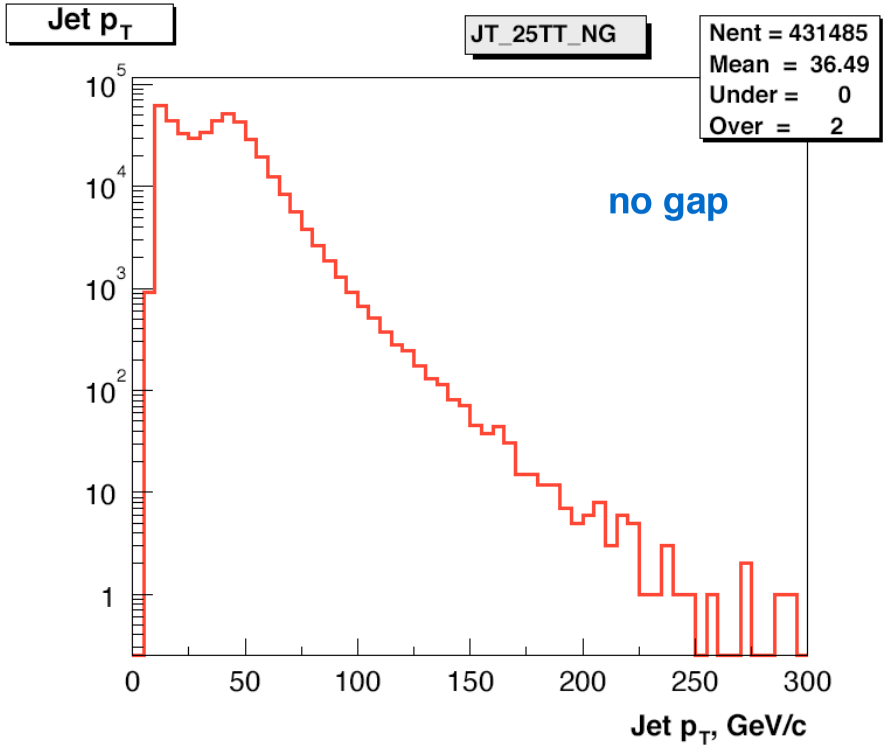
jet f90ch (0.1 < CHF < 0.4)



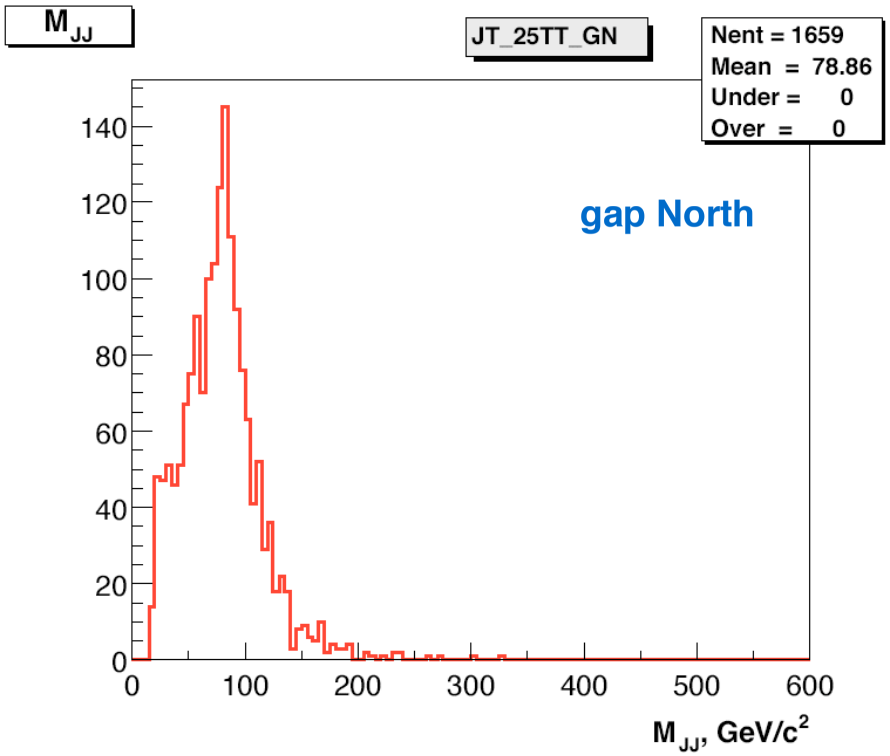


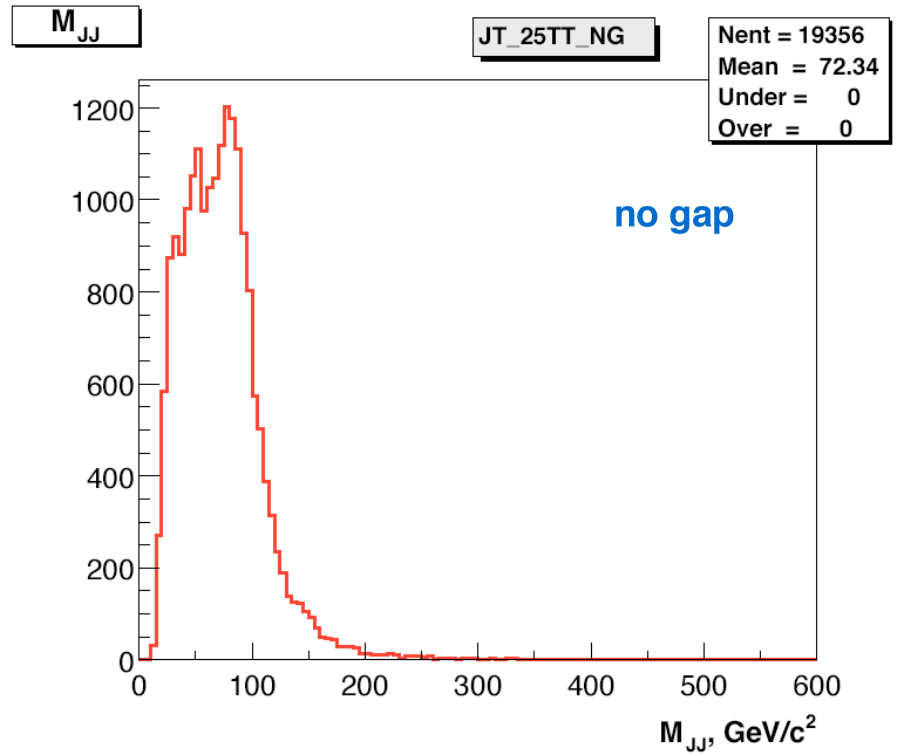
jet p_T (after jet ID cuts)





di-jet mass (| η_{jet} | < 0.5)





To do

- optimal E_{cell} thresholds for different cal. modules (EM, FH, CH)
- rapidity gaps definition
- study jets in events with rapidity gaps