Study of Single-W process

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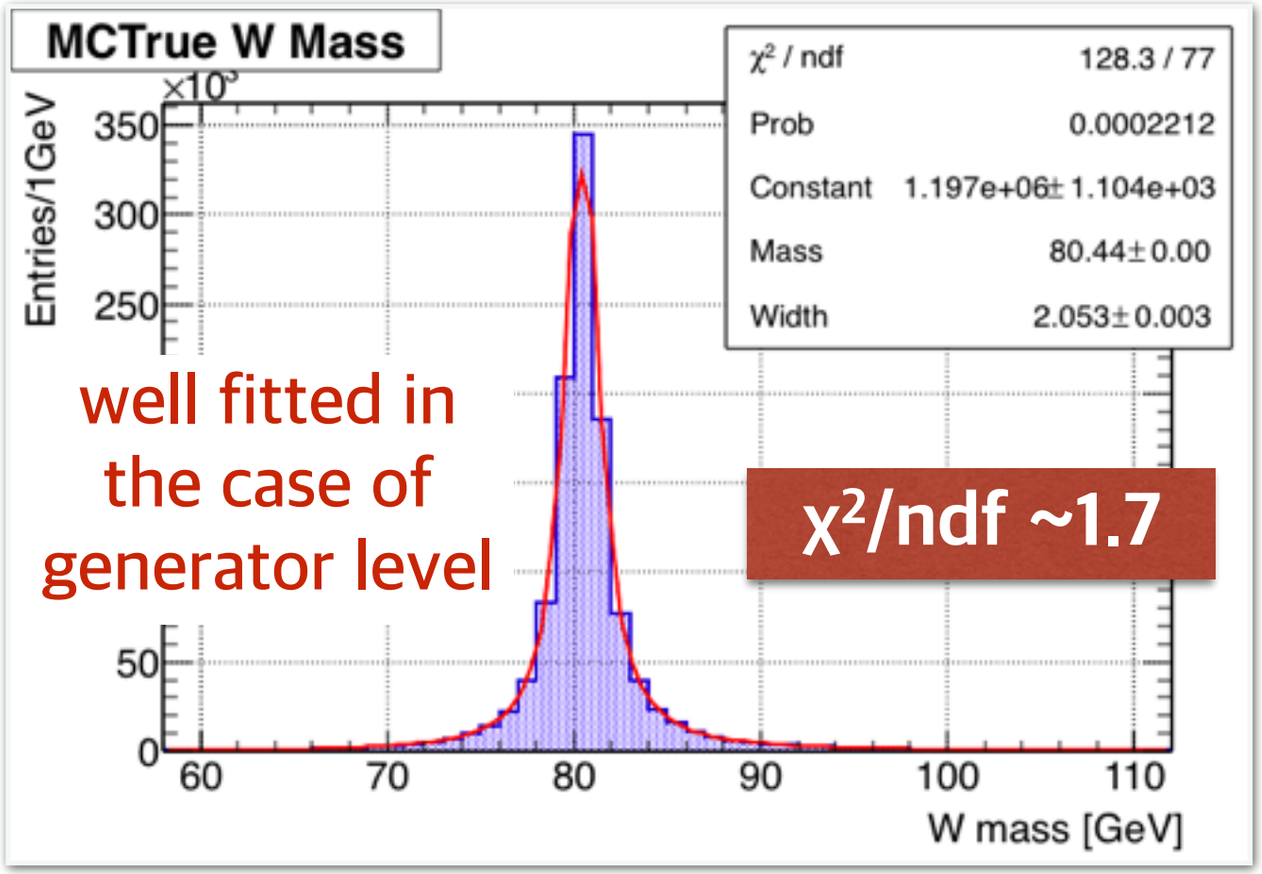
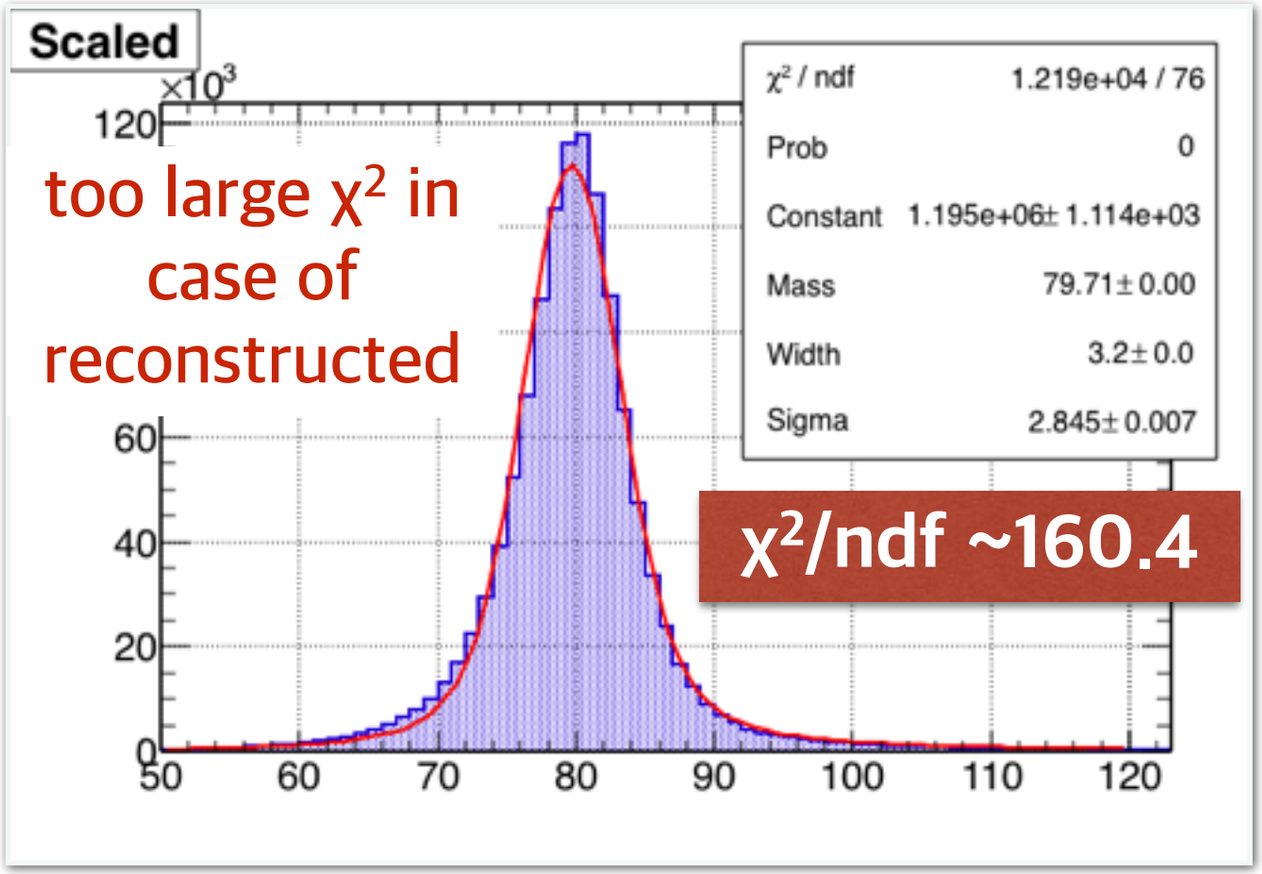
—> Current status & progress of my study

Status

- tried to do relativistic Breit-Wigner fit
- check the performance of FastJet in my analysis case

Fitting result improved





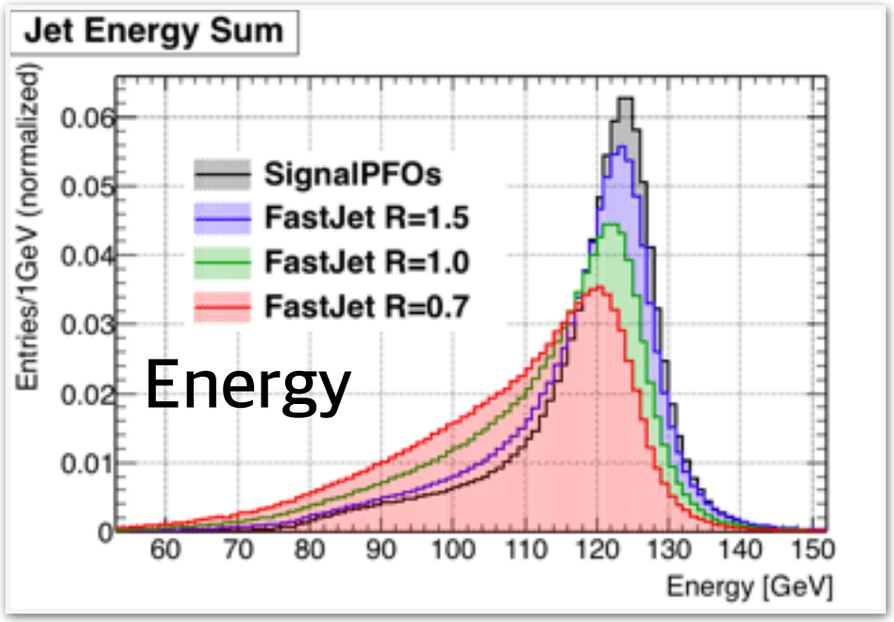
fitted with relativistic Breit-Wigner PDF

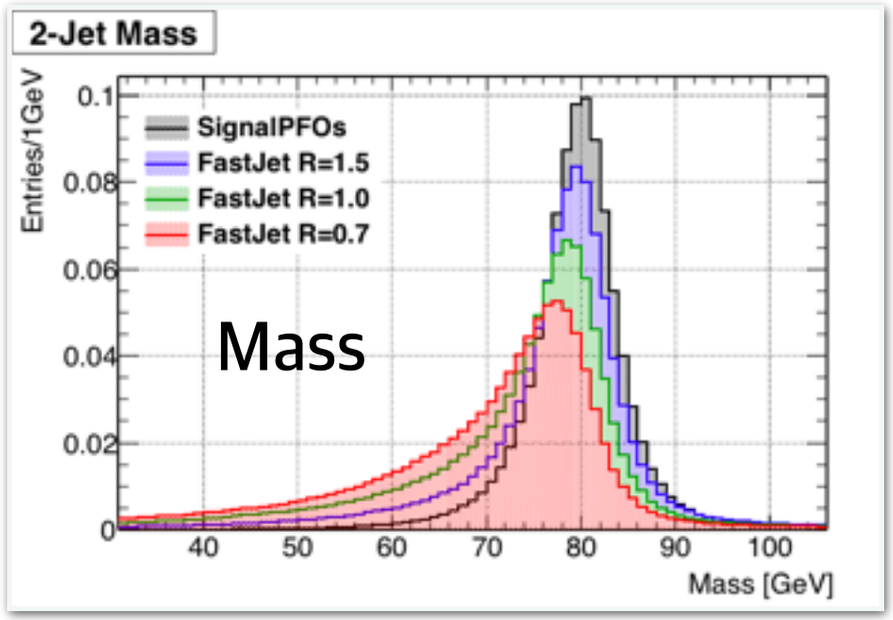
$$F(q; m_W, \Gamma) = \frac{N\Gamma(s)}{(q^2 - m^2)^2 + \Gamma(s)^2}$$

where $\Gamma(s) = m_W \Gamma_W \left(\frac{q^2}{m_W^2} \right)$

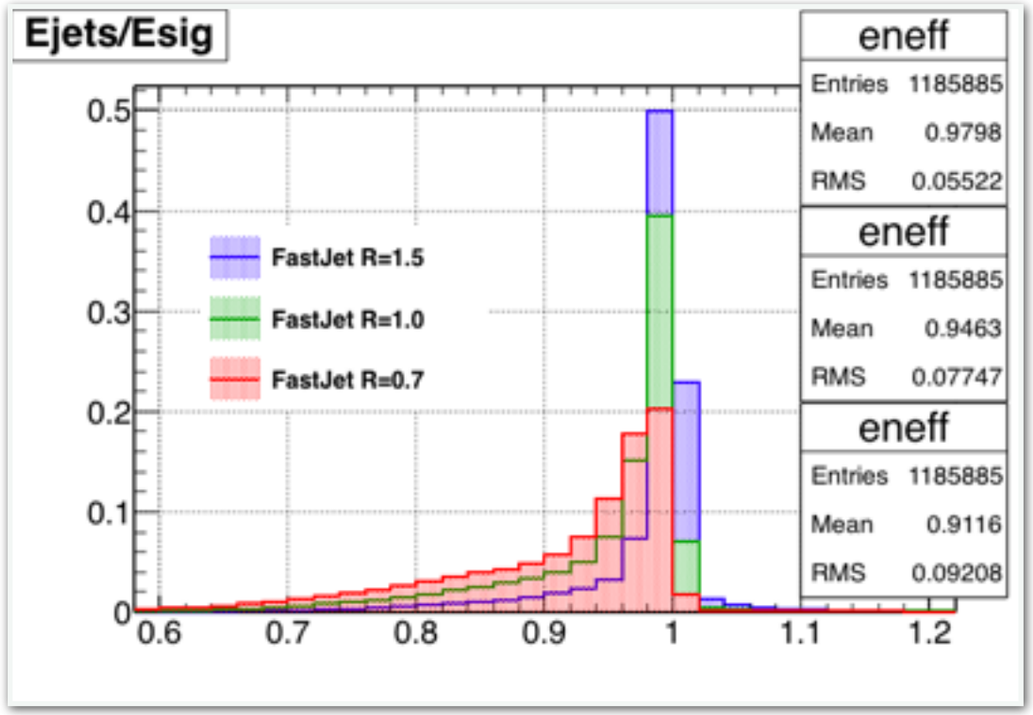
FastJet performance at evW 250GeV

2-jet



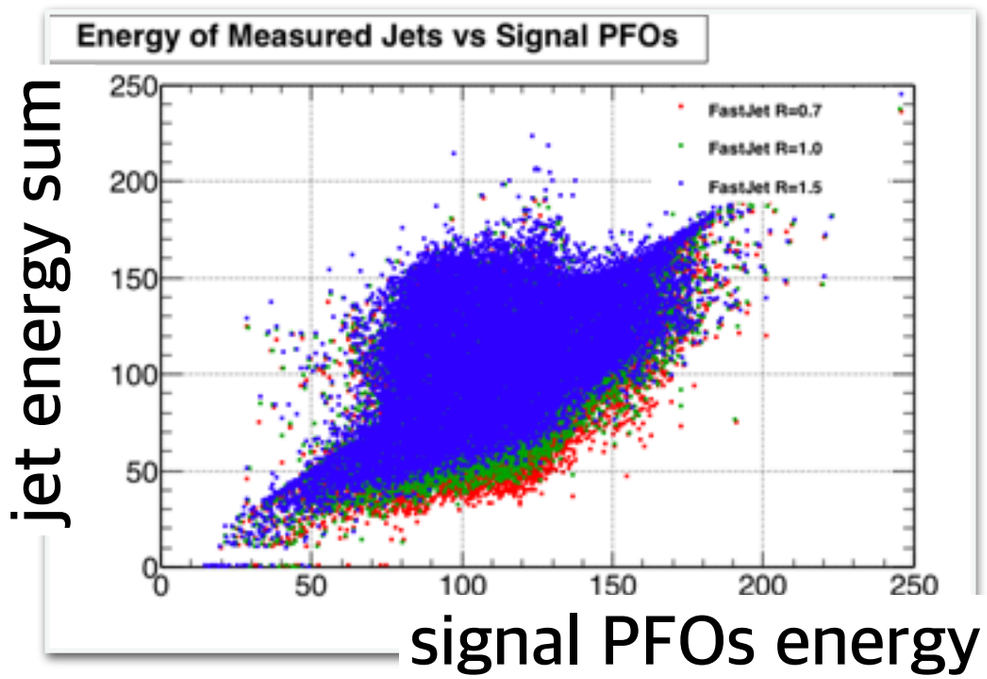


it seems to be there some ‘missed’ signal particles



$$\frac{\Sigma E_{jets}}{E_{signal}}$$

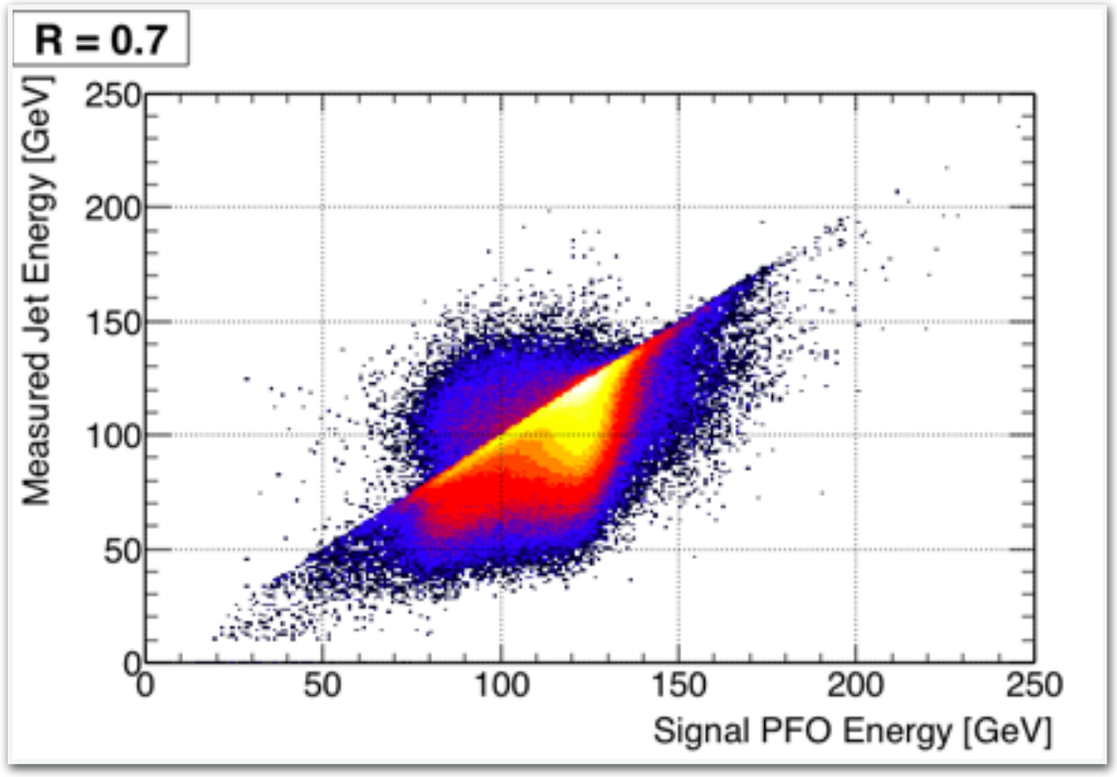
when 2-jet, R=1.5 gives best performance

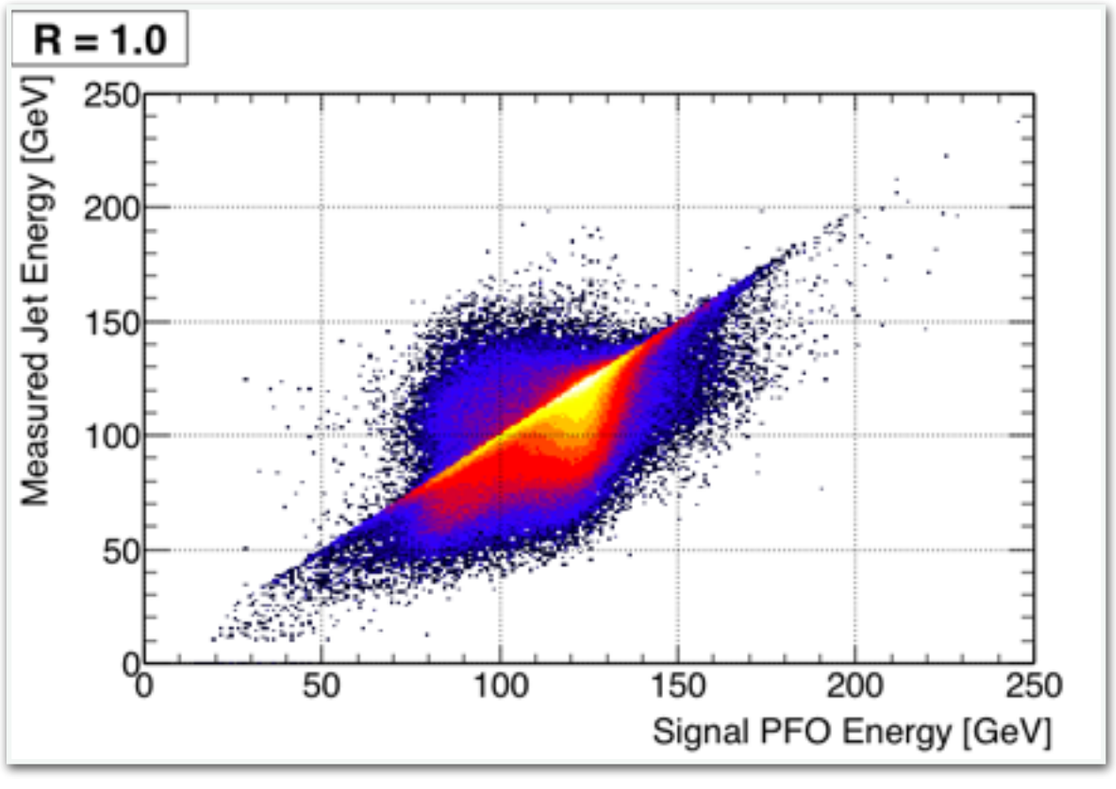


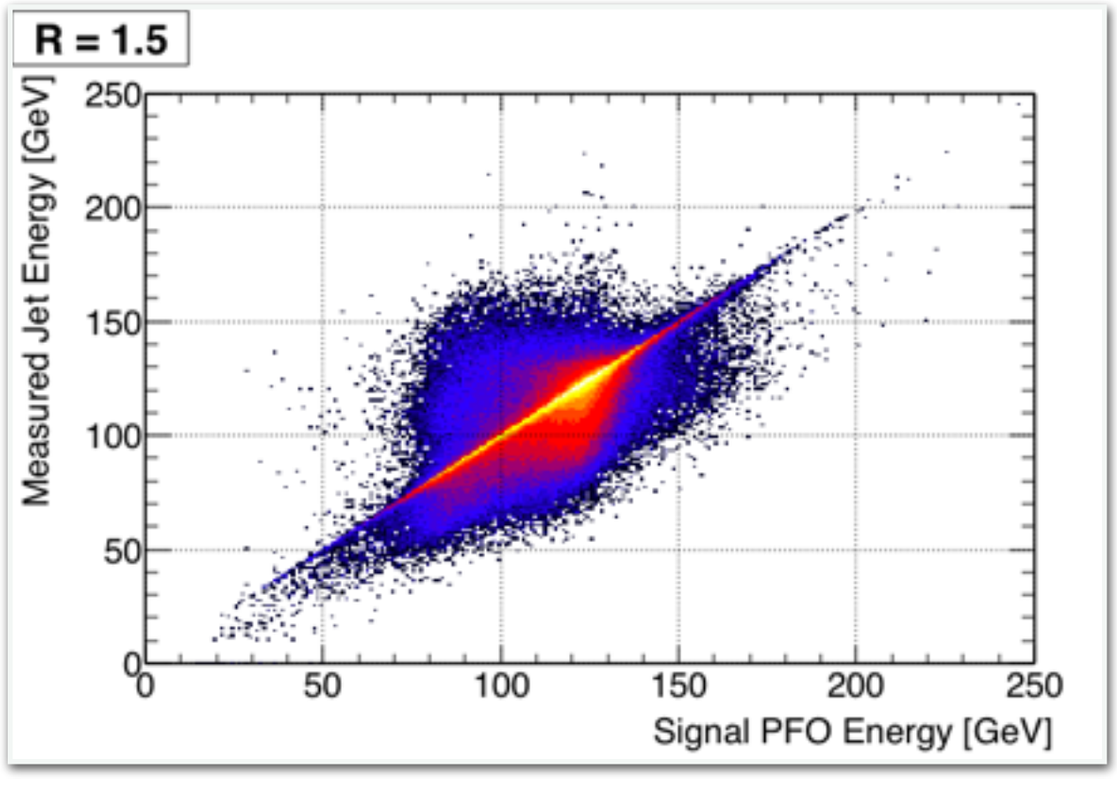
Summary & Next

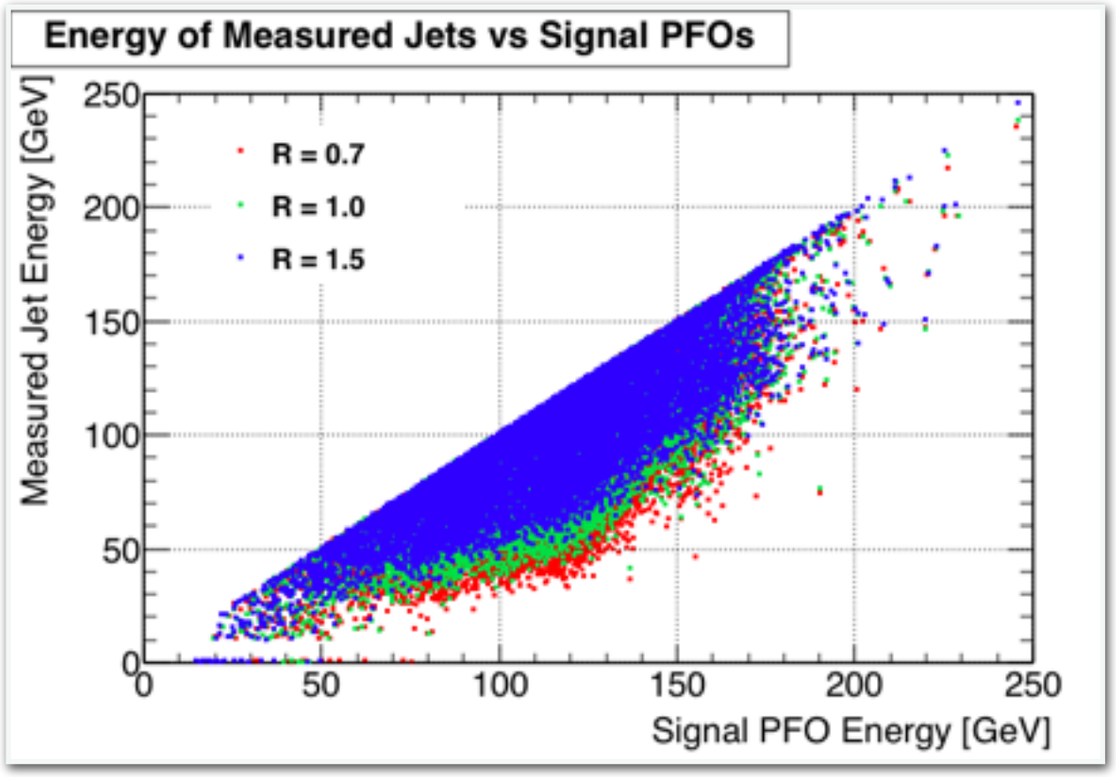
- I tried to fit the W mass peak
  - relativistic Breit-Wigner fit works well at generator level
  - but in case of scaled, it didn't works very well
- FastJet(kt_algorithm) gives best performance at R=1.5 for 2-jet case
- for the next,
  - MVA approach to tag ISRs and overlays (if necessary)
  - error study
  - impact of different calorimeter option study in this direct m_W measurement case

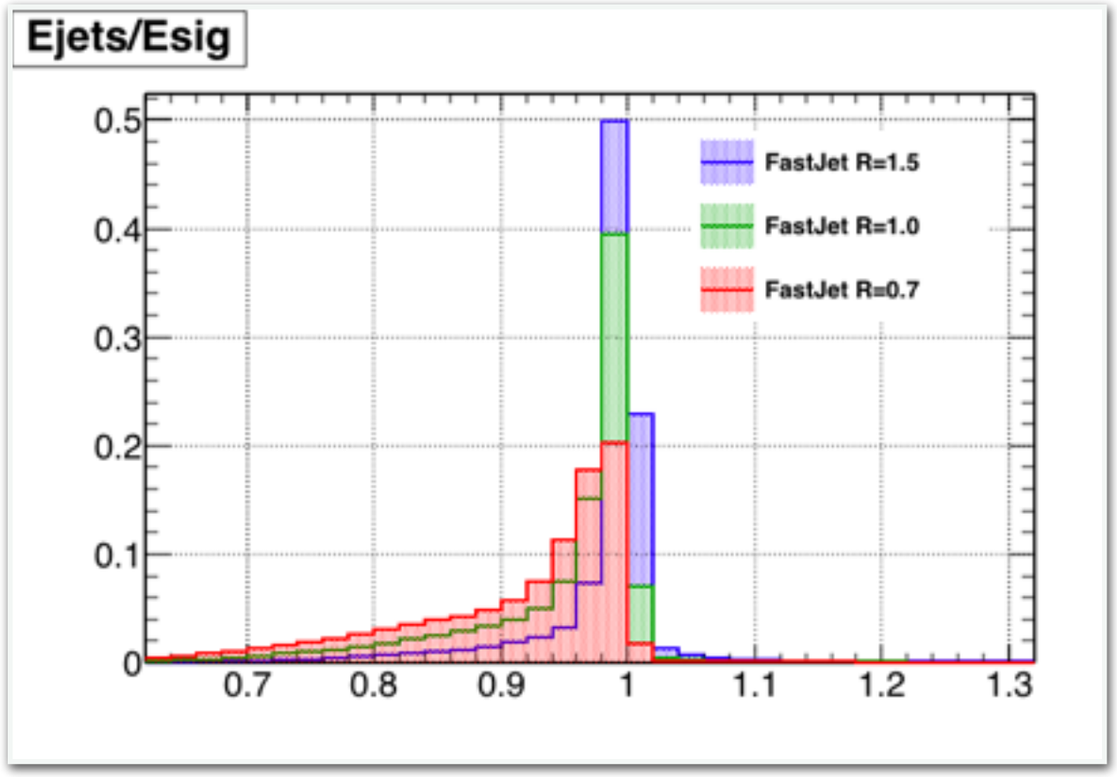
Back up

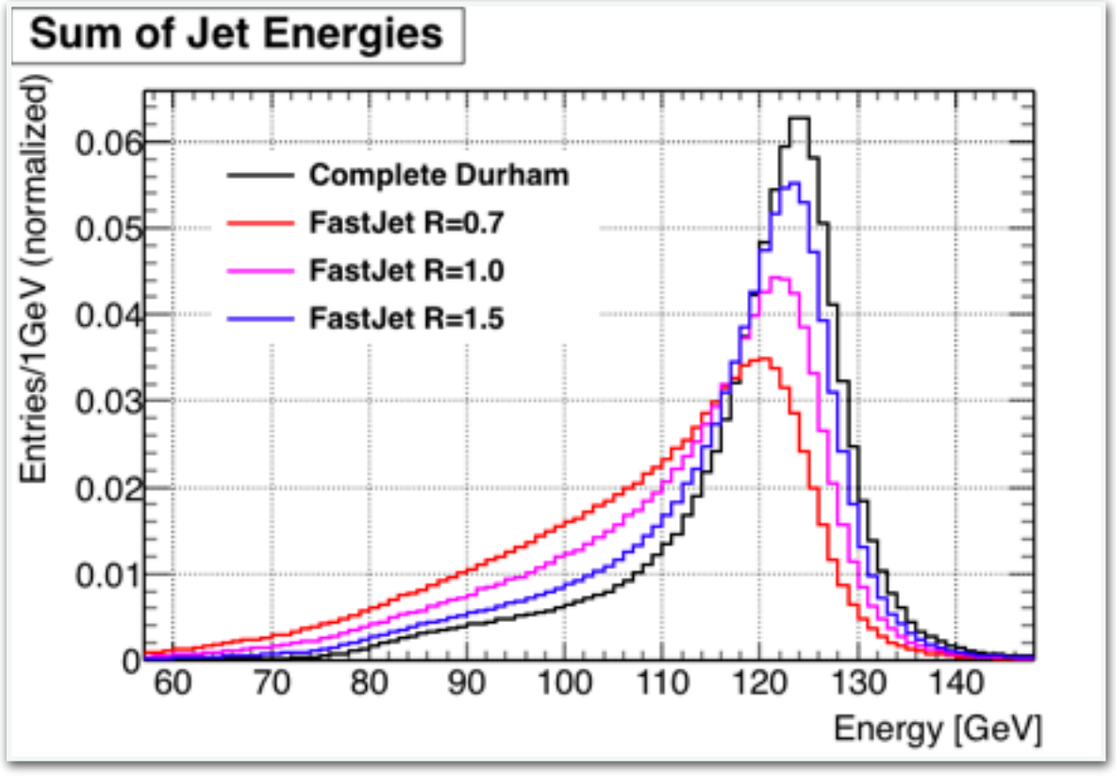

R = 0.7
Measured Jet Energy [GeV]
Signal PFO Energy [GeV]
0
50
100
150
200
250

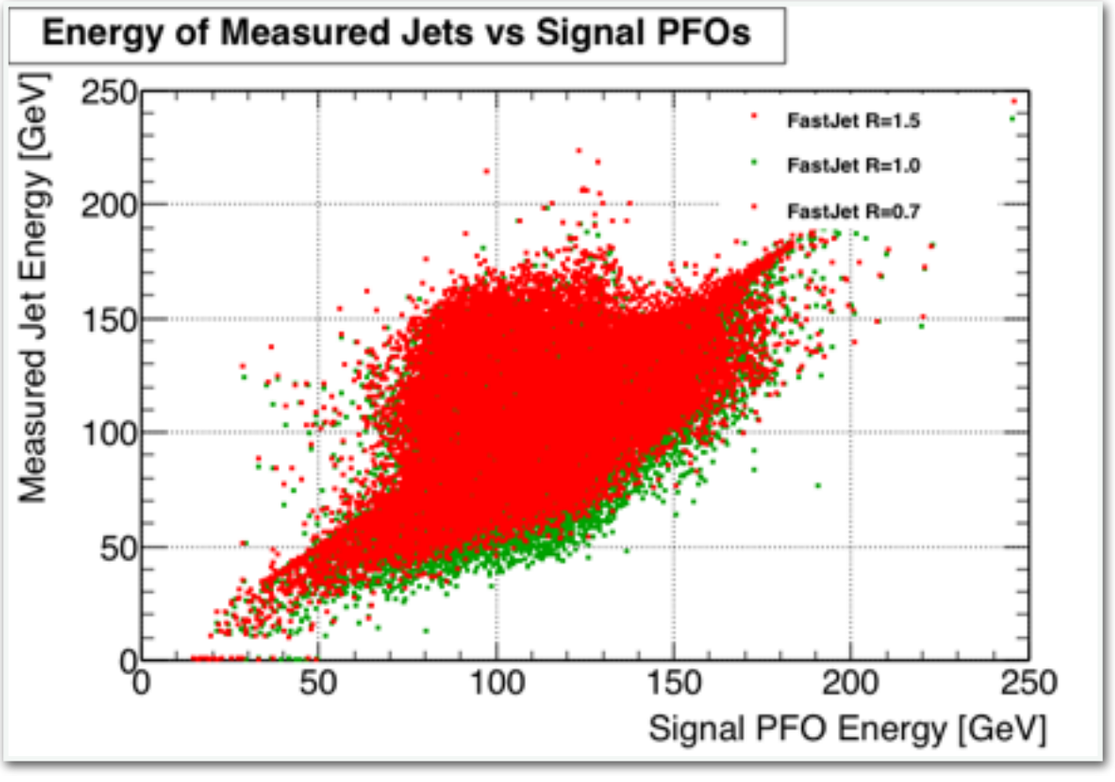

R = 1.0
Measured Jet Energy [GeV]
Signal PFO Energy [GeV]
0
50
100
150
200
250


R = 1.5
Measured Jet Energy [GeV]
Signal PFO Energy [GeV]
0
50
100
150
200
250


Energy of Measured Jets vs Signal PFOs
Measured Jet Energy [GeV]
Signal PFO Energy [GeV]
R = 0.7
R = 1.0
R = 1.5
0
50
100
150
200
250


Ejets/Esig
FastJet R=1.5
FastJet R=1.0
FastJet R=0.7
0
0.1
0.2
0.3
0.4
0.5
0.7
0.8
0.9
1
1.1
1.2
1.3


Sum of Jet Energies
Entries/1GeV (normalized)
Energy [GeV]
Complete Durham
FastJet R=0.7
FastJet R=1.0
FastJet R=1.5
0
0.01
0.02
0.03
0.04
0.05
0.06
60
70
80
90
100
110
120
130
140


Energy of Measured Jets vs Signal PFOs
Measured Jet Energy [GeV]
Signal PFO Energy [GeV]
FastJet R=1.5
FastJet R=1.0
FastJet R=0.7
0
50
100
150
200
250