# UE and OOC Jet Et Contribution in Data and MC for W+n jet(s) Events

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  - Jet Fragmentation
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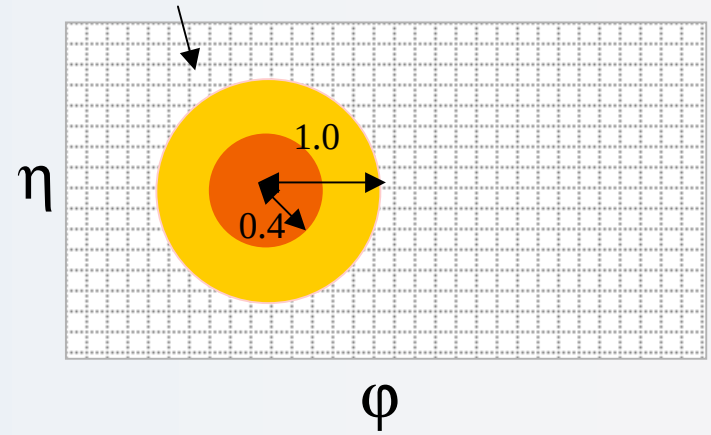
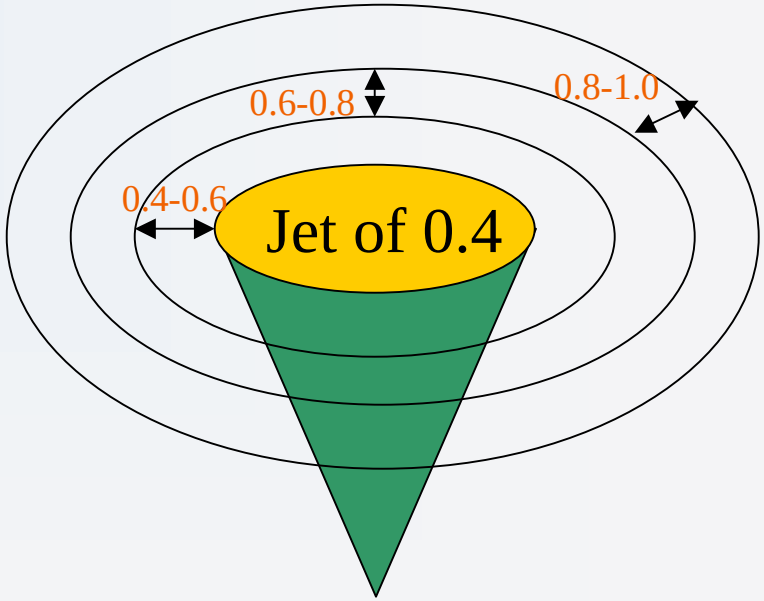
# Definitions

- Calculate the UE Et density
  - Average Et over area of towers in calorimeter which are away from any jet, with Et ≥ 5 GeV, in the event by at least ΔR = 1.0 from jet centroid
- Calculate the jet contribution Et density in different jet annuli (0.4-0.6, 0.6-0.8 and 0.8-1.0)
  - Average Et over area of towers which fall in the annuli and are not shared by any other jet (are away from any other jet by at least R=1.0)
- Calculate the Et needed to correct for jet contribution out of the jet cone and UE contribution into the cone

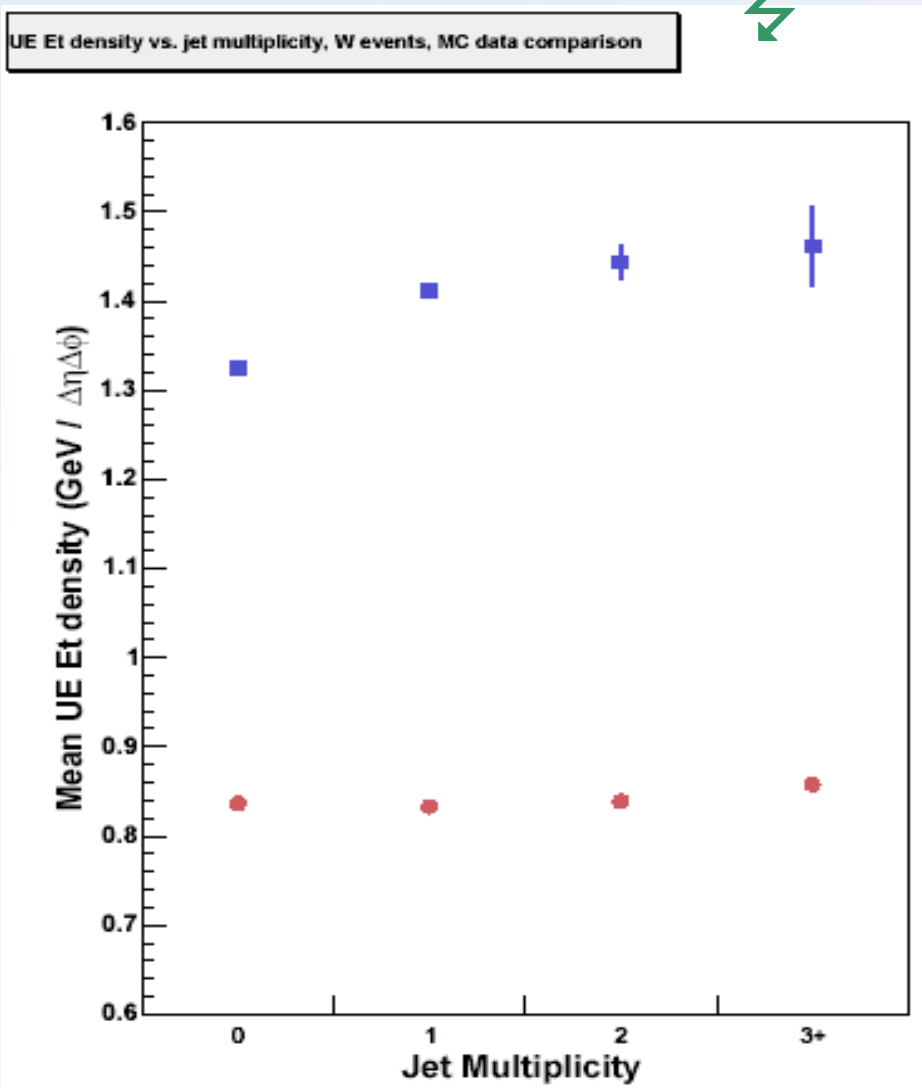
Jet of 0.4 and its annuli

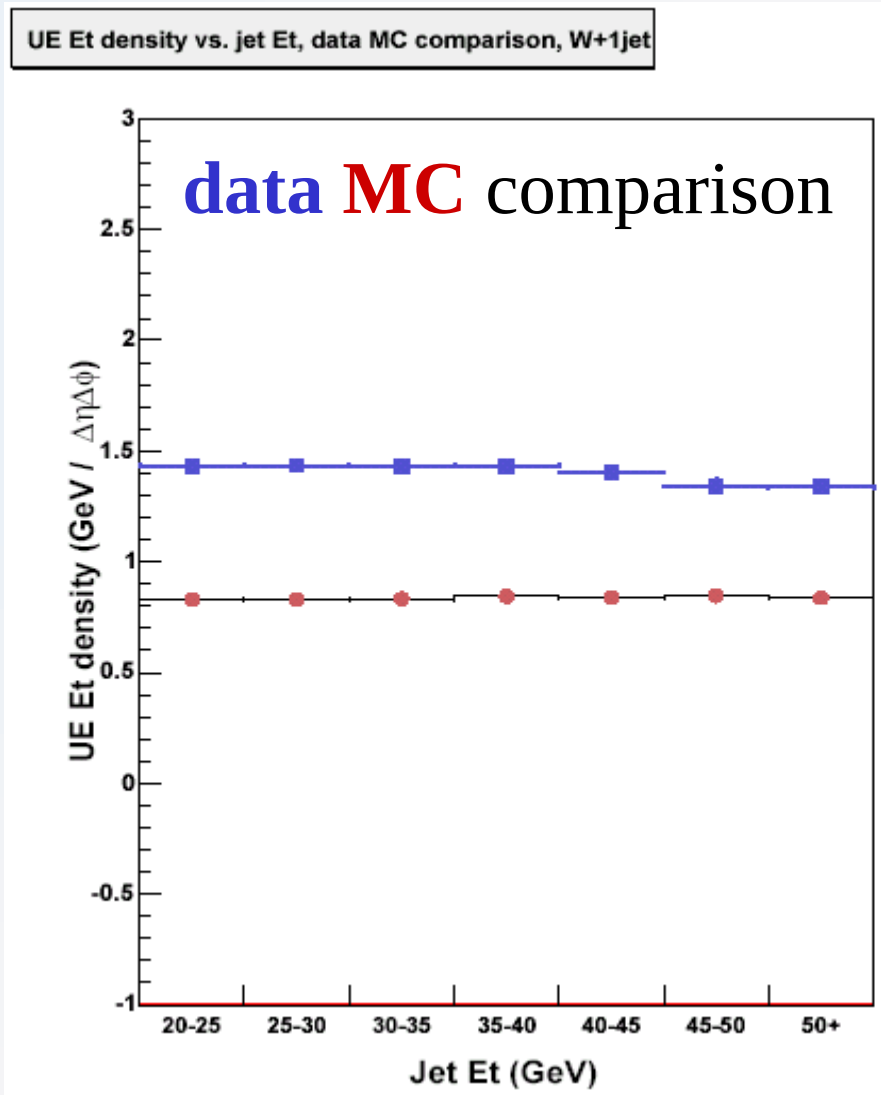



$$OOC = \sum_{annuli} Et - (A_{cone1.0} \times Et_{UE}^{density})$$

# UE Et density in W + n jets, W+1jet





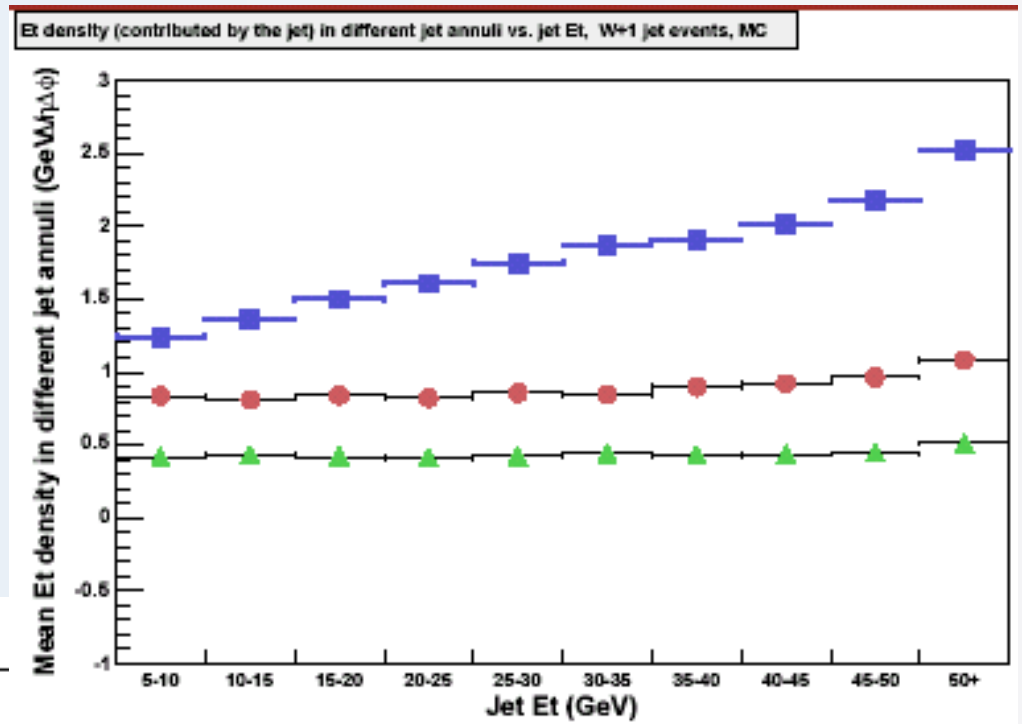

**Jet: Et ≥ 20 GeV, |η| ≥ 2.4**

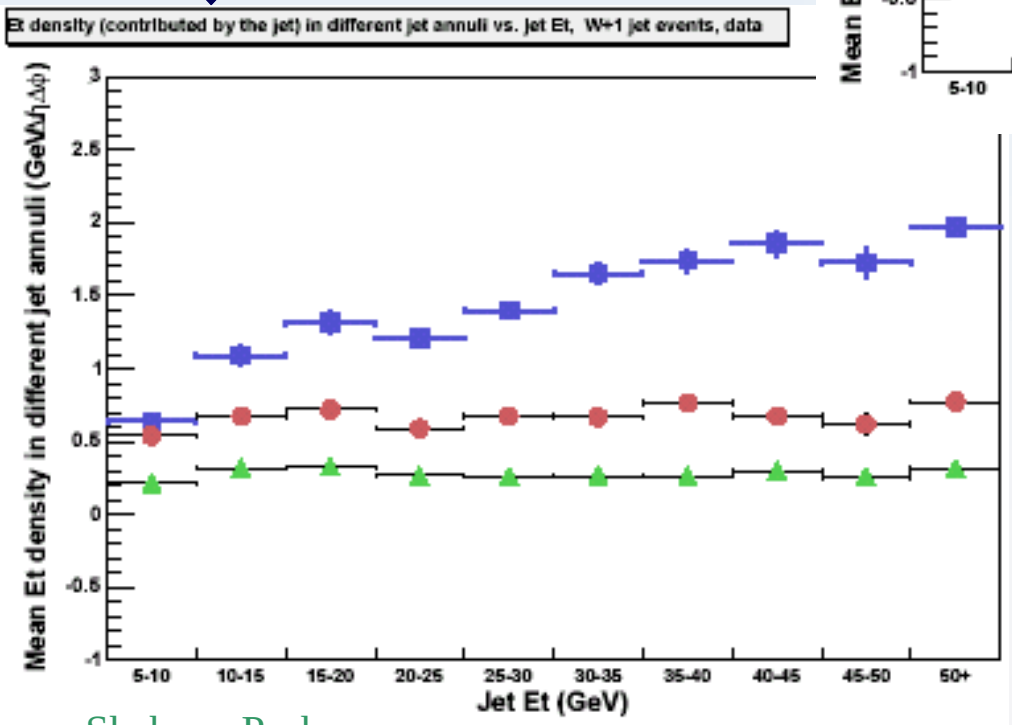
# Jet Et contribution in its annuli as a function of jet Et
# W+1jet event

**data**

⇓

**MC ⇒**




Annulus 0.4-0.6

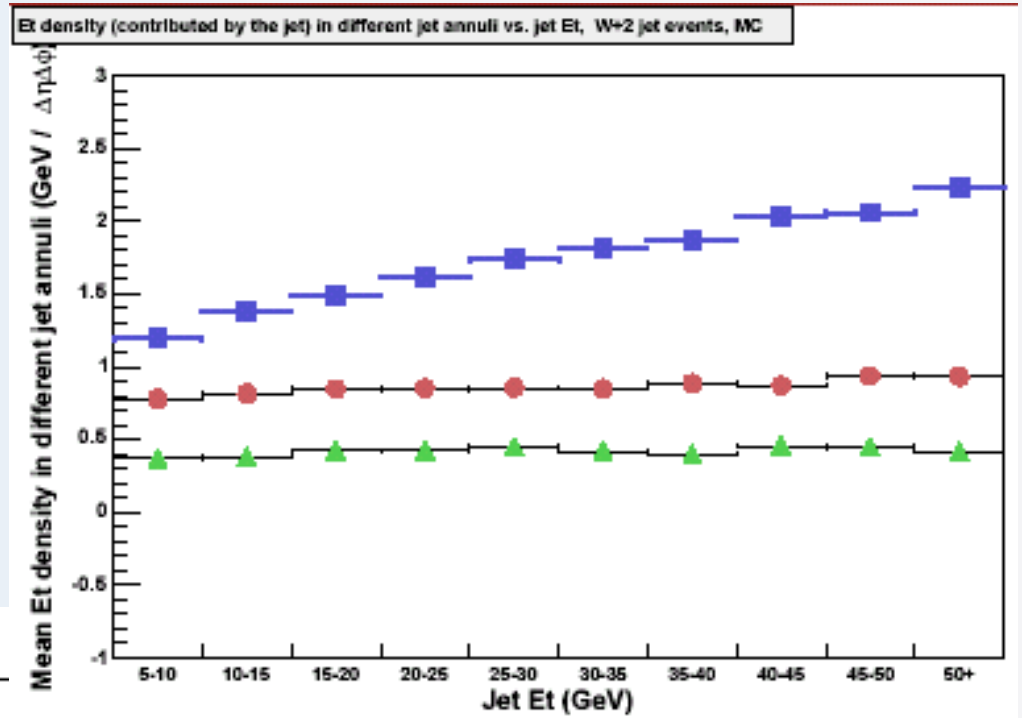
Annulus 0.6-0.8

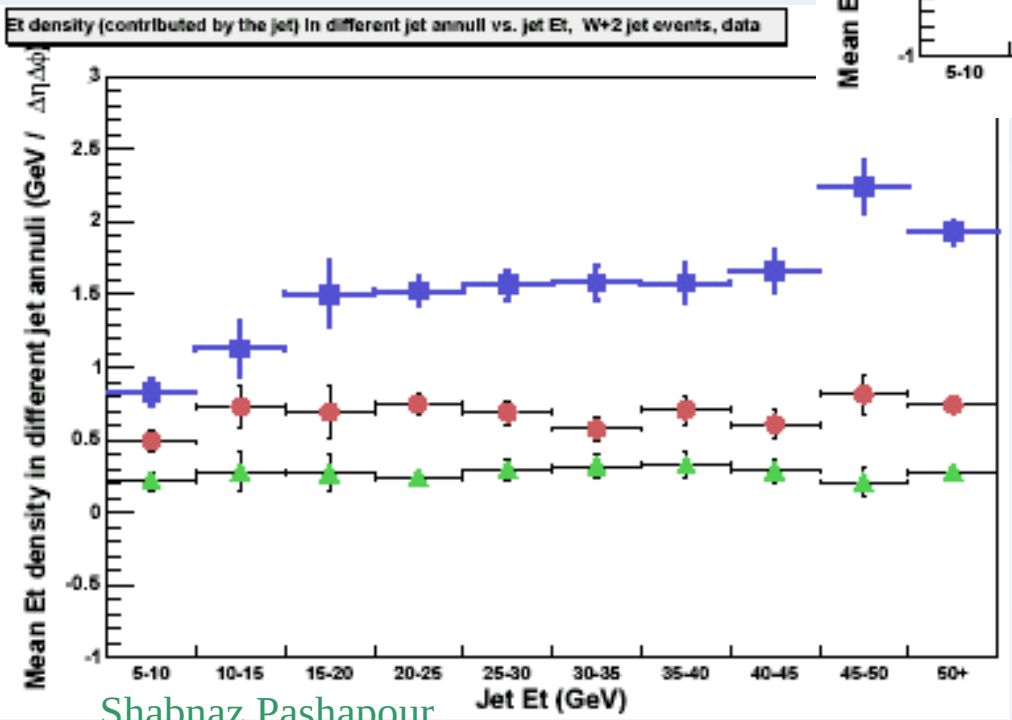
Annulus 0.8-1.0

# Jet Et contribution in its annuli as a function of jet Et
# W+2jets event

**data** ⇓

**MC ⇒**




Annulus 0.4-0.6

Annulus 0.6-0.8

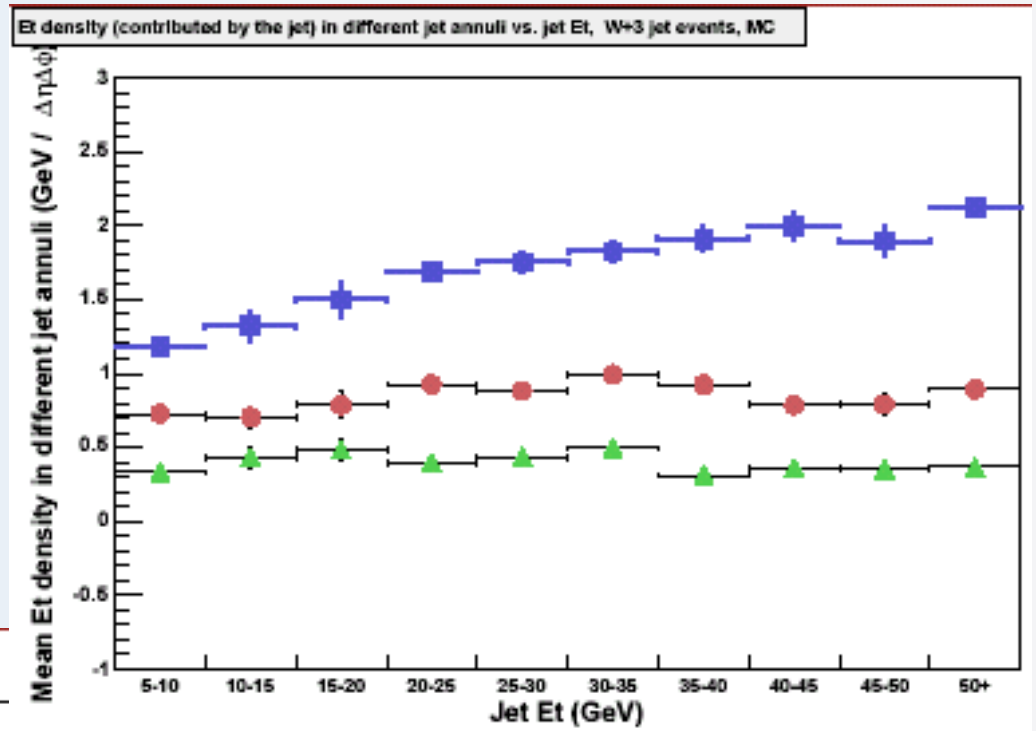
Annulus 0.8-1.0

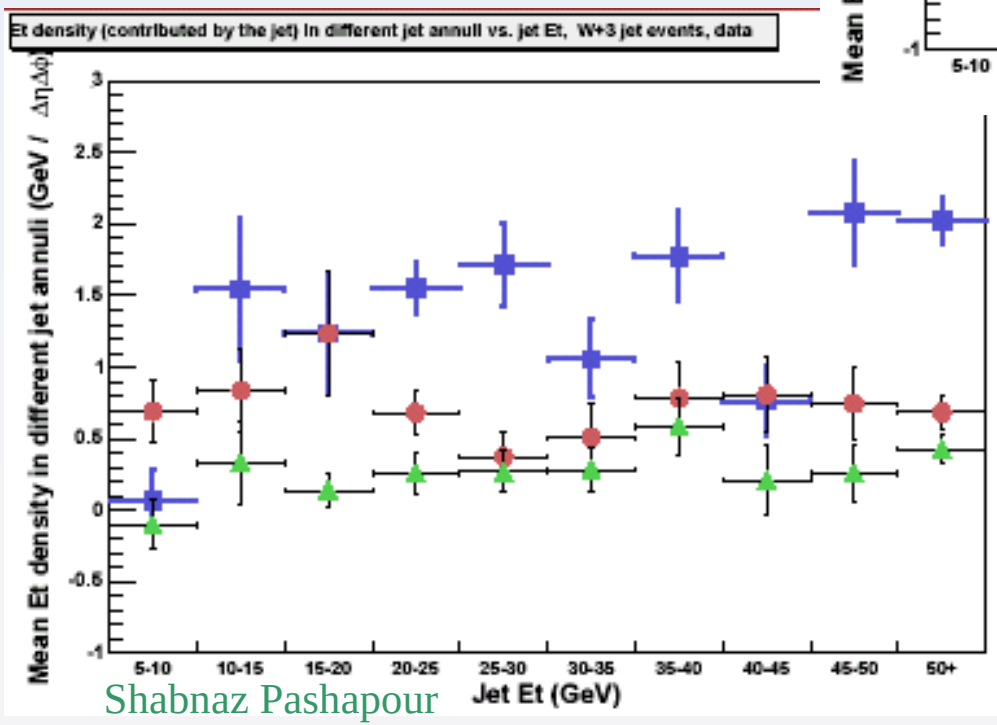
# Jet Et contribution in its annuli as a function of jet Et W+3jets event

**data**

⇓

**MC ⇒**




Annulus 0.4-0.6

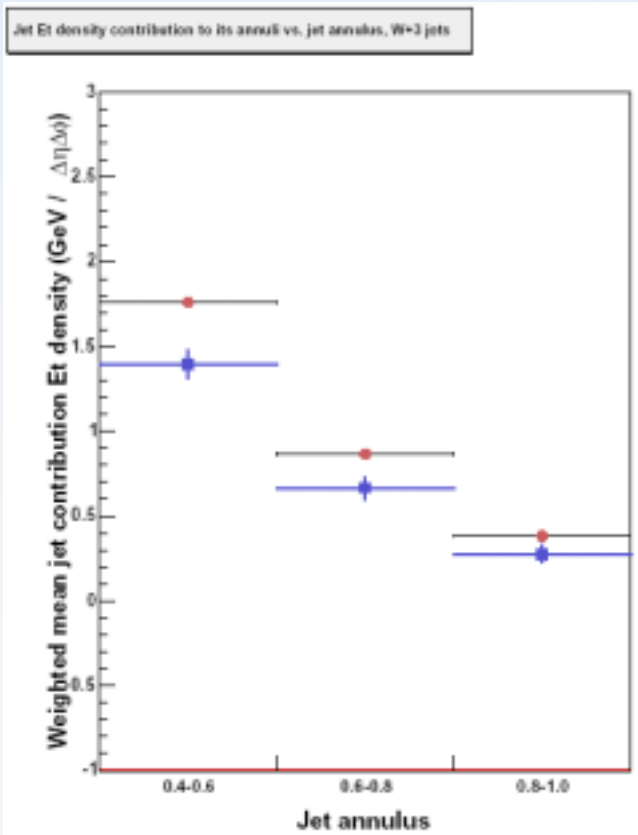
Annulus 0.6-0.8

Annulus 0.8-1.0

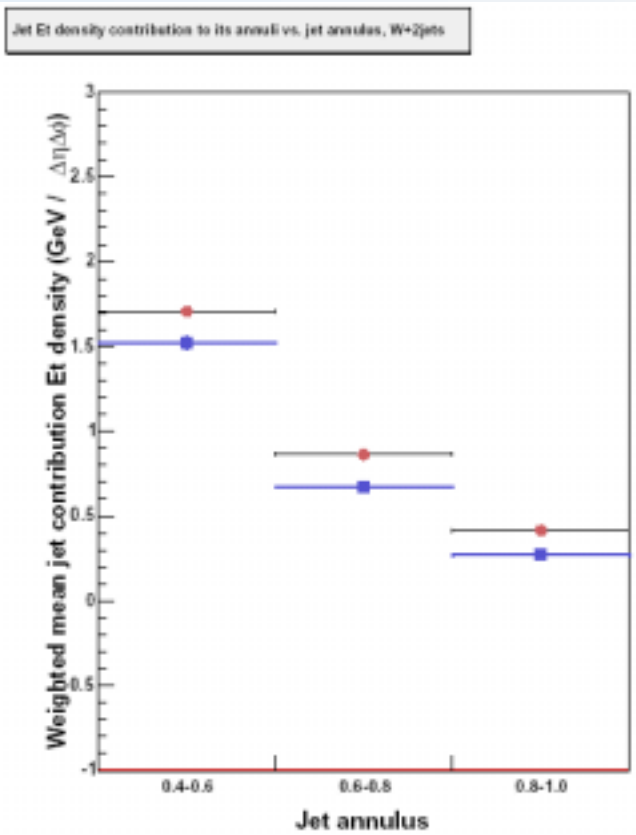
# Jet Et contribution to its annuli

## **data MC** comparison

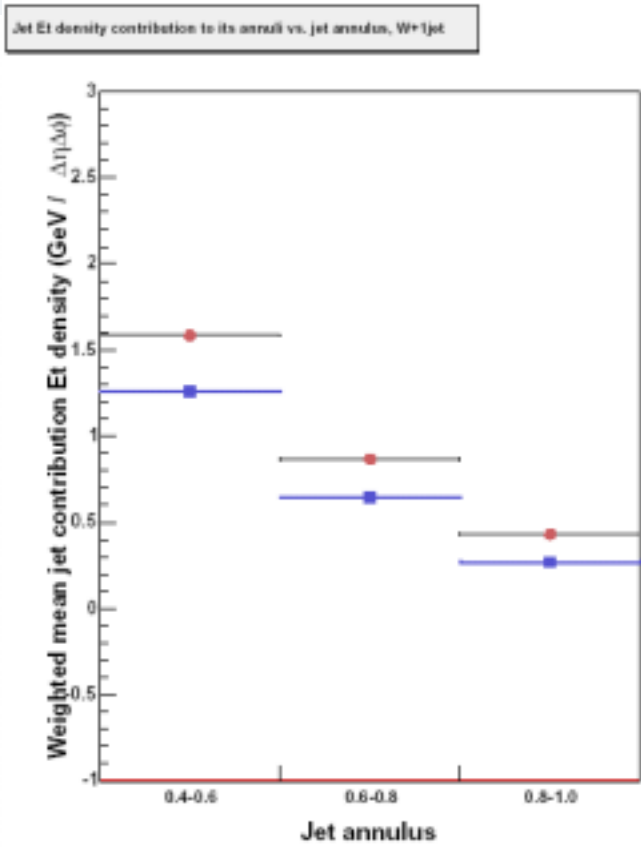
W+ ≥ 3 jets



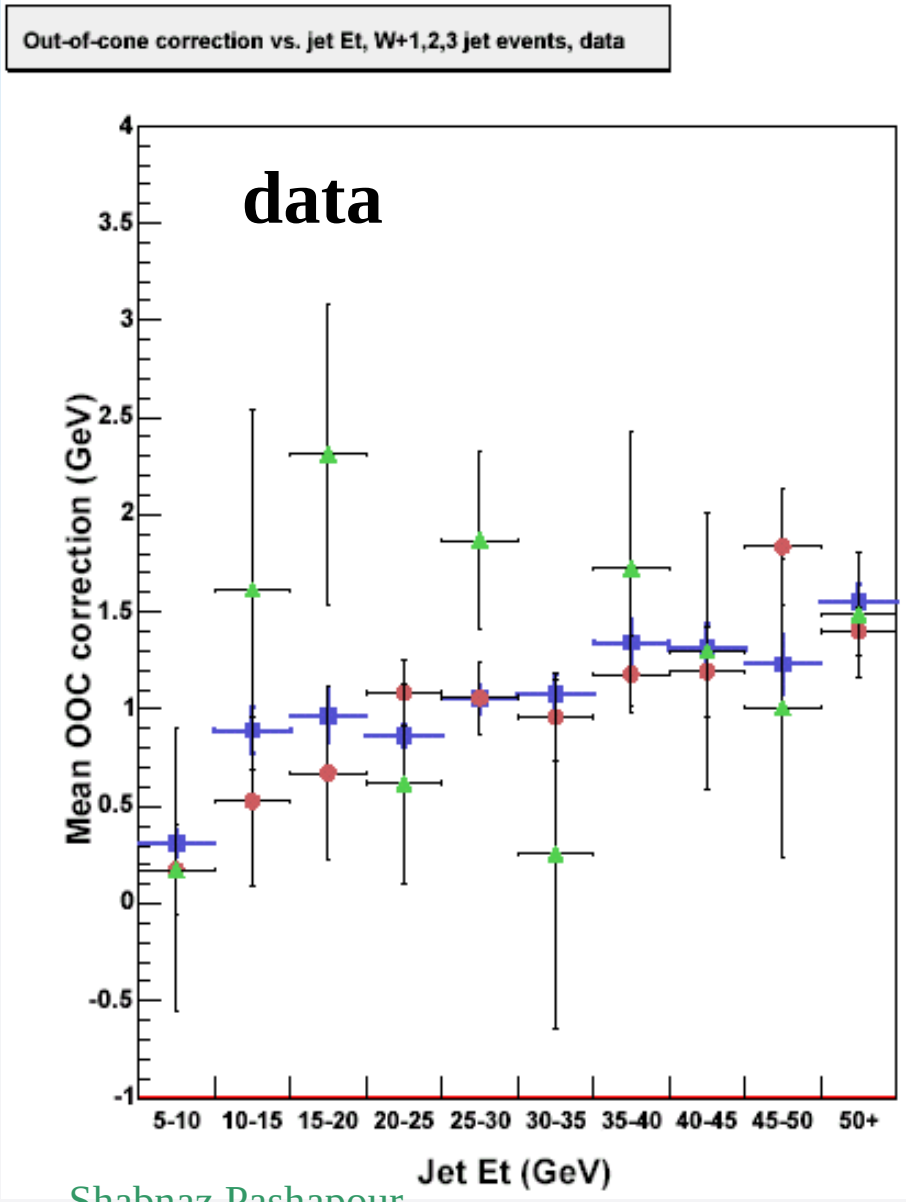

W+ 2 jets

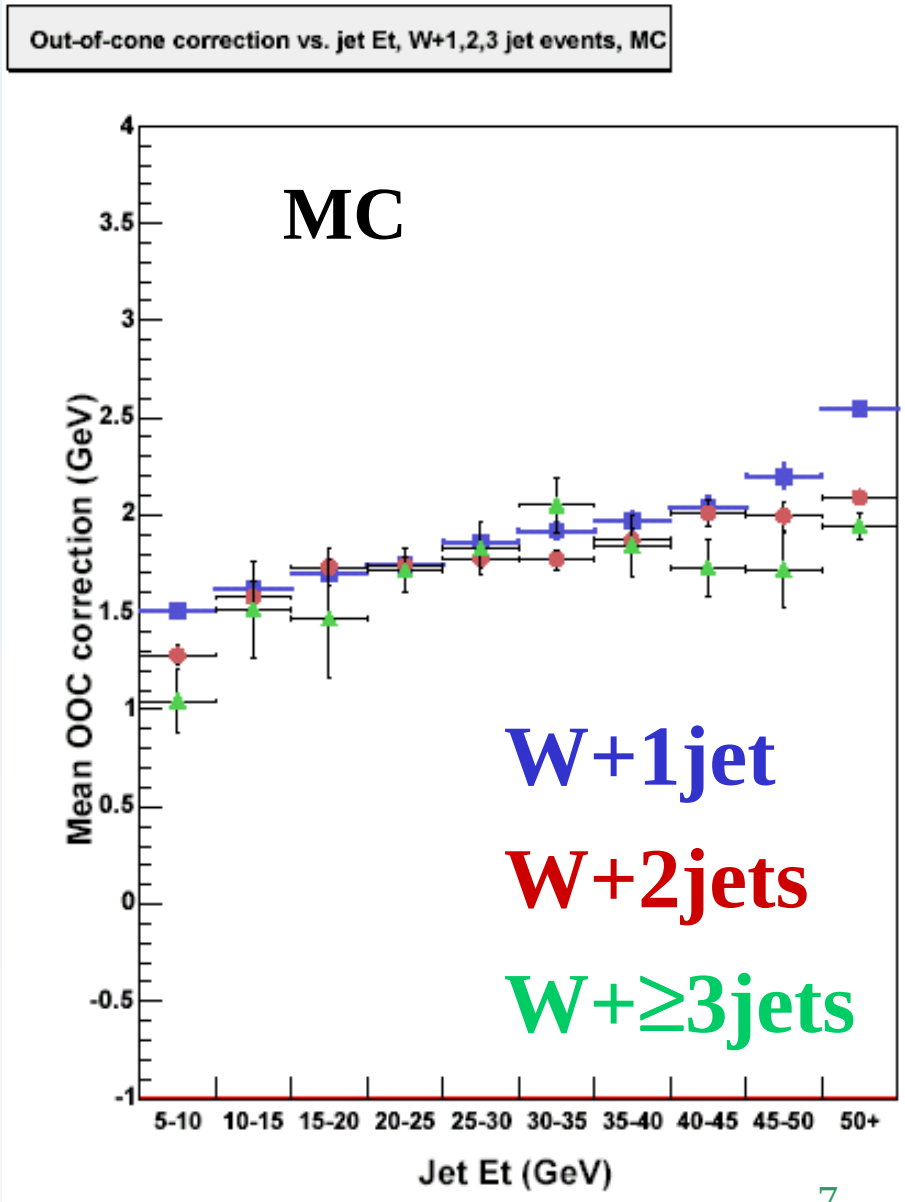



W+ 1 jet



# Out-of-cone contribution for a 0.4 jet up to 1.0

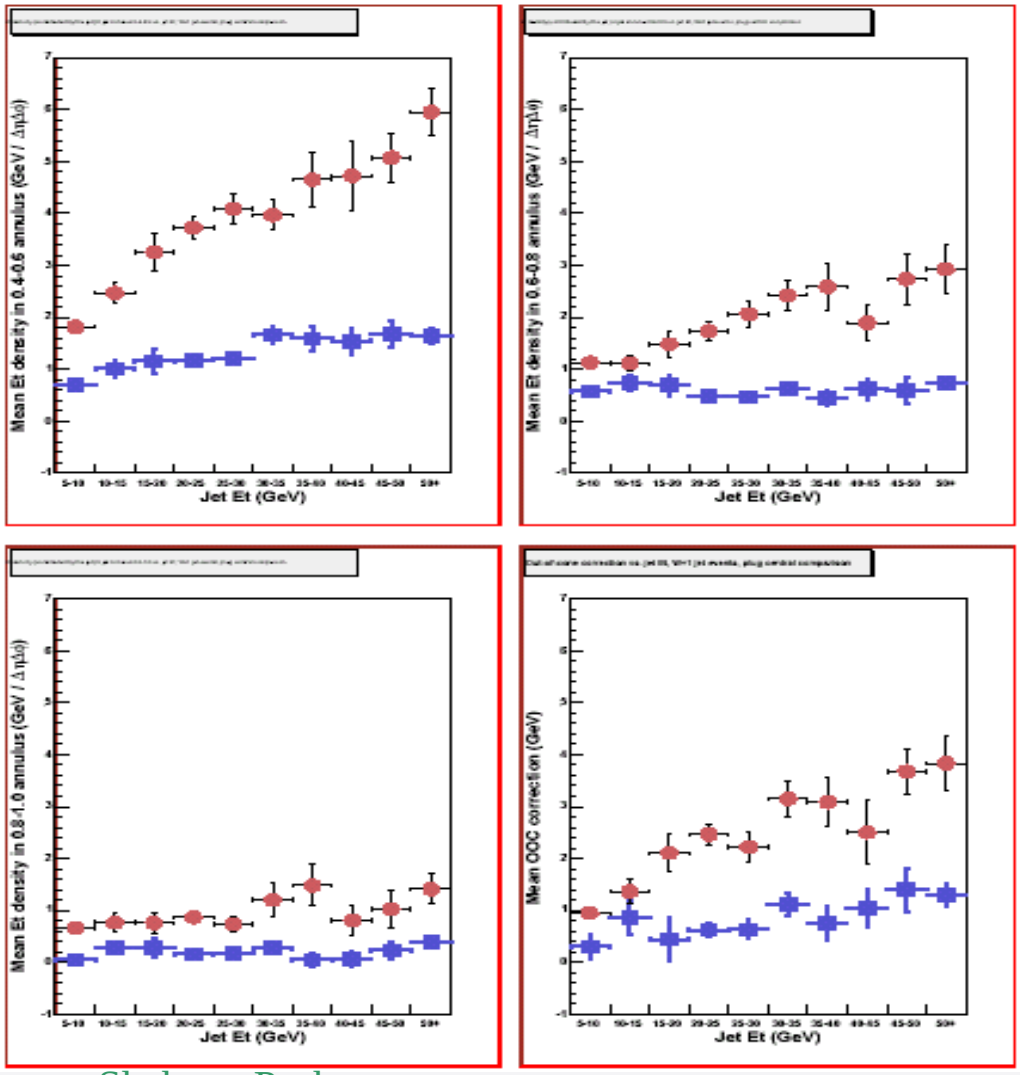


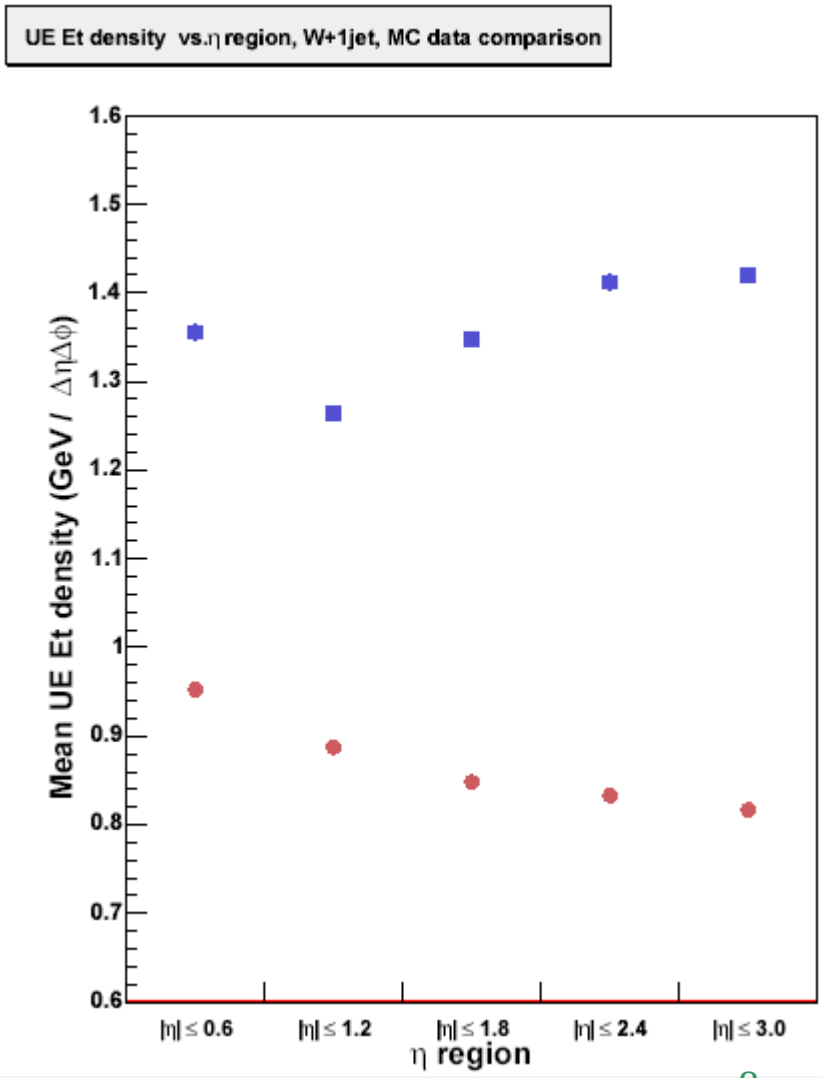
# UE Et density as a function of η and calorimeters response

## W+1jet

**Central Plug** comparison




**data MC** comparison



# Summary

- Used W+n jet events, data and MC
- UE Et density
  - MC is lower than data
- Jet Et density contribution in its annuli
  - MC higher than data
  - MC has a similar shape to data
- Out-of-cone correction
  - MC higher than data
  - MC has a similar shape to data
- Questions remaining
  - $\eta$ dependence
  - Plug/Central calorimeter response

# Outlook

- Look at 5.3.1 samples
  - Check PYTHIA Tune-A W events
  - Compare Jet samples
- Investigate the remaining questions so far
- Look at track multiplicity
  - W events
  - Dijet events