# Muon isolation

- Event selection on different samples (Atautau, Ztautau, QCD) indicate possible wrong muon selection
- In our case ($\tau\tau \rightarrow lh$) when there is decay to muons ($\tau \rightarrow \mu \nu_\tau \nu_\mu$), the muon track is very isolated in the EM calorimeter.
- We'll consider four configurations in $\Delta R$ to understand the muon isolation variables in the datasets.

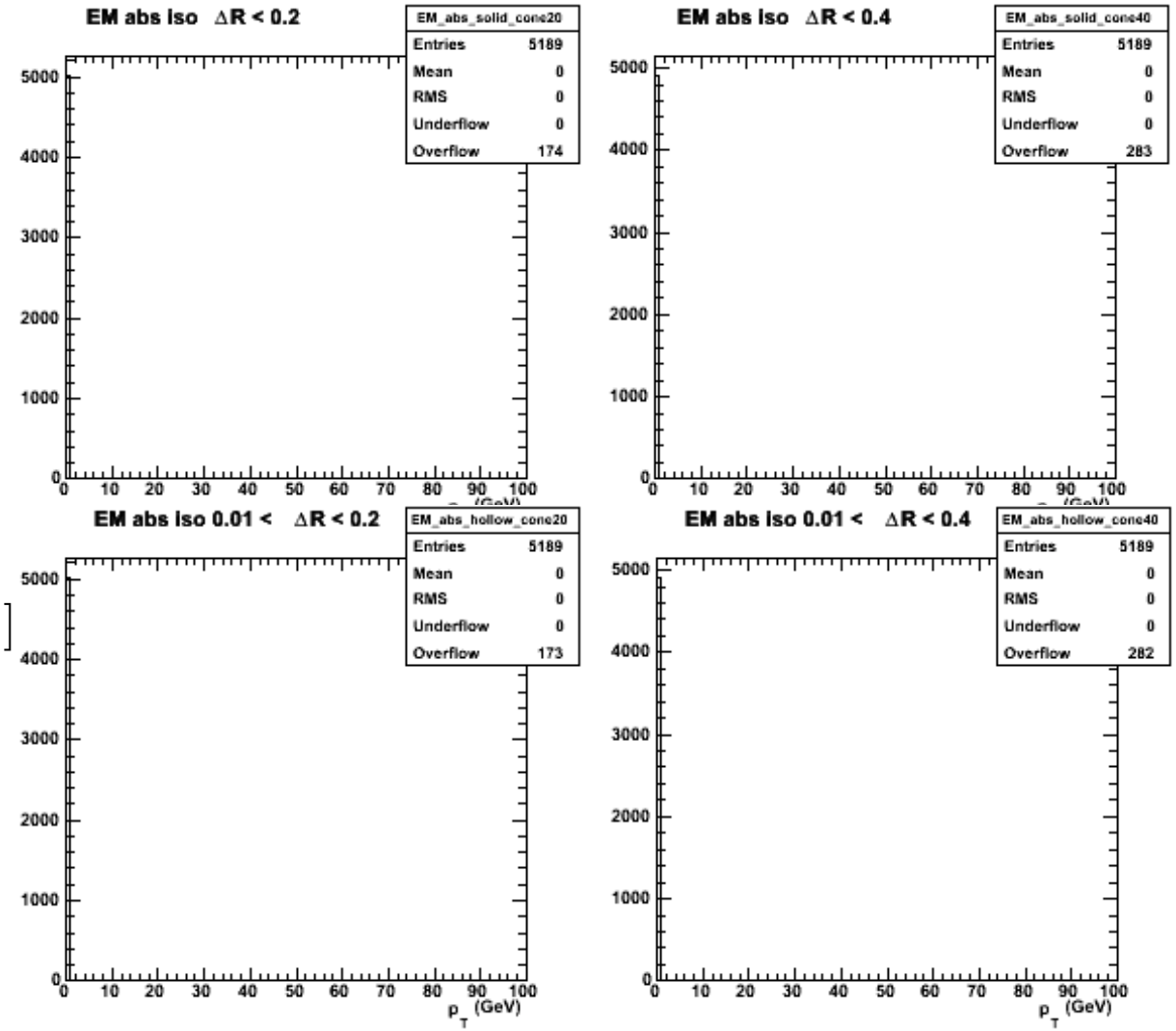
| ΔR min | ΔR max |
|---|---|
| 0.0 | 0.2 |
| 0.0 | 0.4 |
| 0.01 | 0.2 |
| 0.01 | 0.4 |

# EM cluster absolute isolation

- ~97% of the reconstructed muons have 0 GeV EM cluster deposit

$$\sum^{\#\text{topo}} E_T^{\text{topo}}$$

$$\forall\ \Delta R(\mu, \text{topo}) \in [\Delta R_{min}, \Delta R_{max}]$$

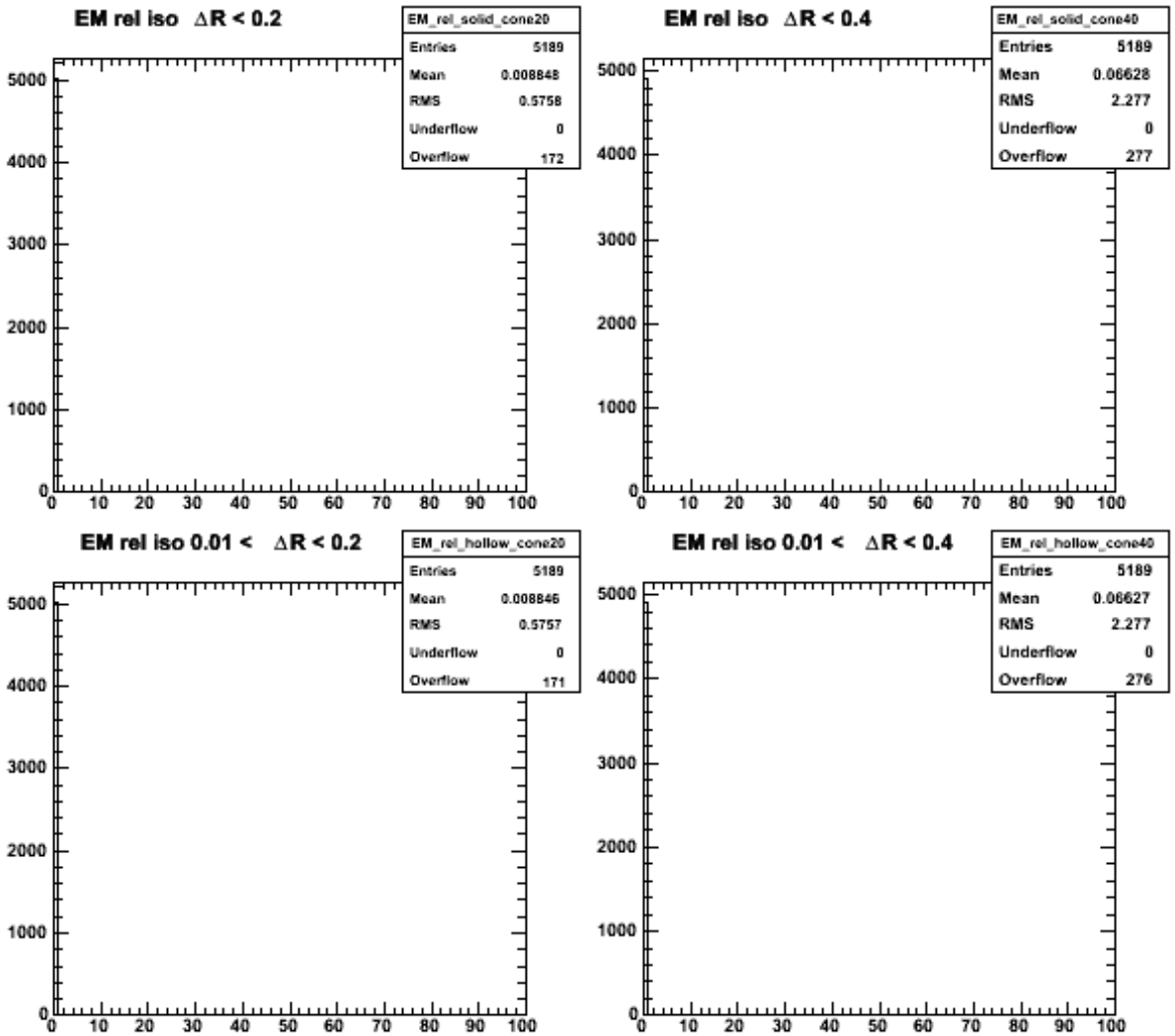


# EM cluster relative isolation

- ~97% of the reconstructed muons have 0 GeV EM cluster deposit

$$\sum^{\#\text{topo}} \frac{E_T^{\text{topo}}}{p_T^{\mu}}$$

$$\forall\ \Delta R(\mu, \text{topo}) \in [\Delta R_{min}, \Delta R_{max}]$$

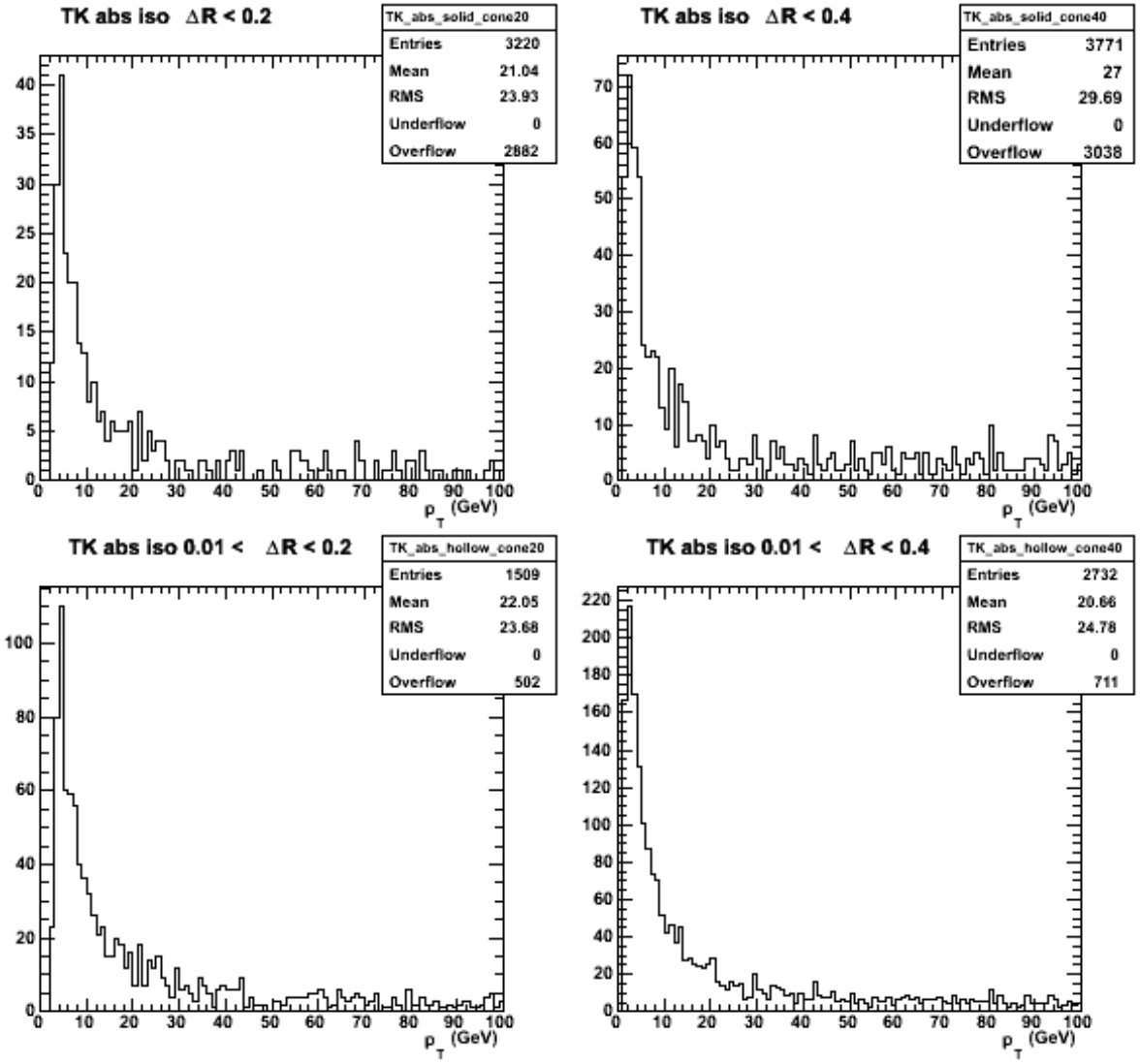


# Track absolute isolation

- We can cut on absolute track isolation

$$\sum^{\#\mathrm{trk}} E_T^{\mathrm{trk}}$$

$$\forall\ \Delta R(\mu, \mathrm{trk}) \in [\Delta R_{min}, \Delta R_{max}]$$

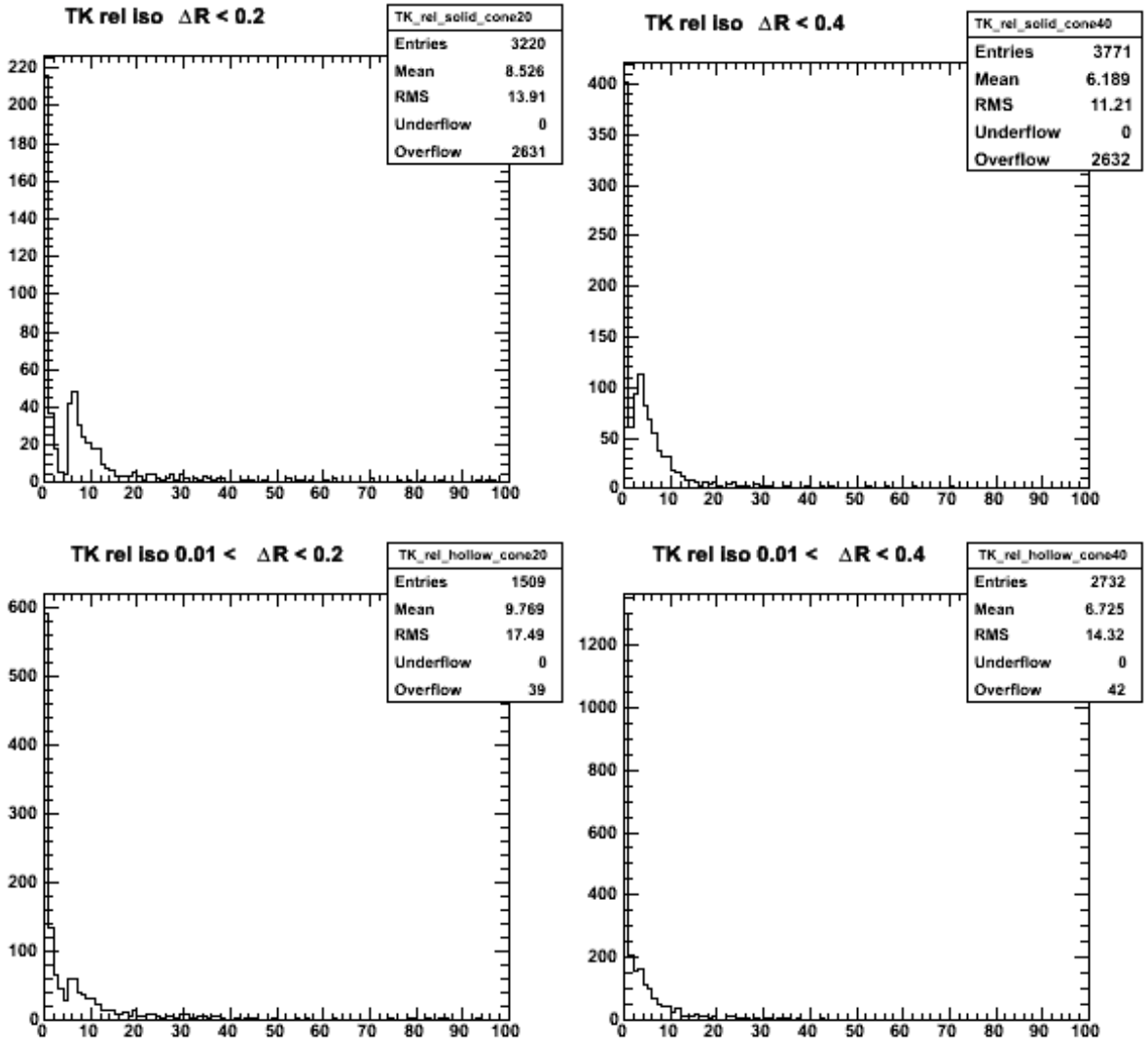


# Track relative isolation

- We can cut on ~10GeV the relative track isolation

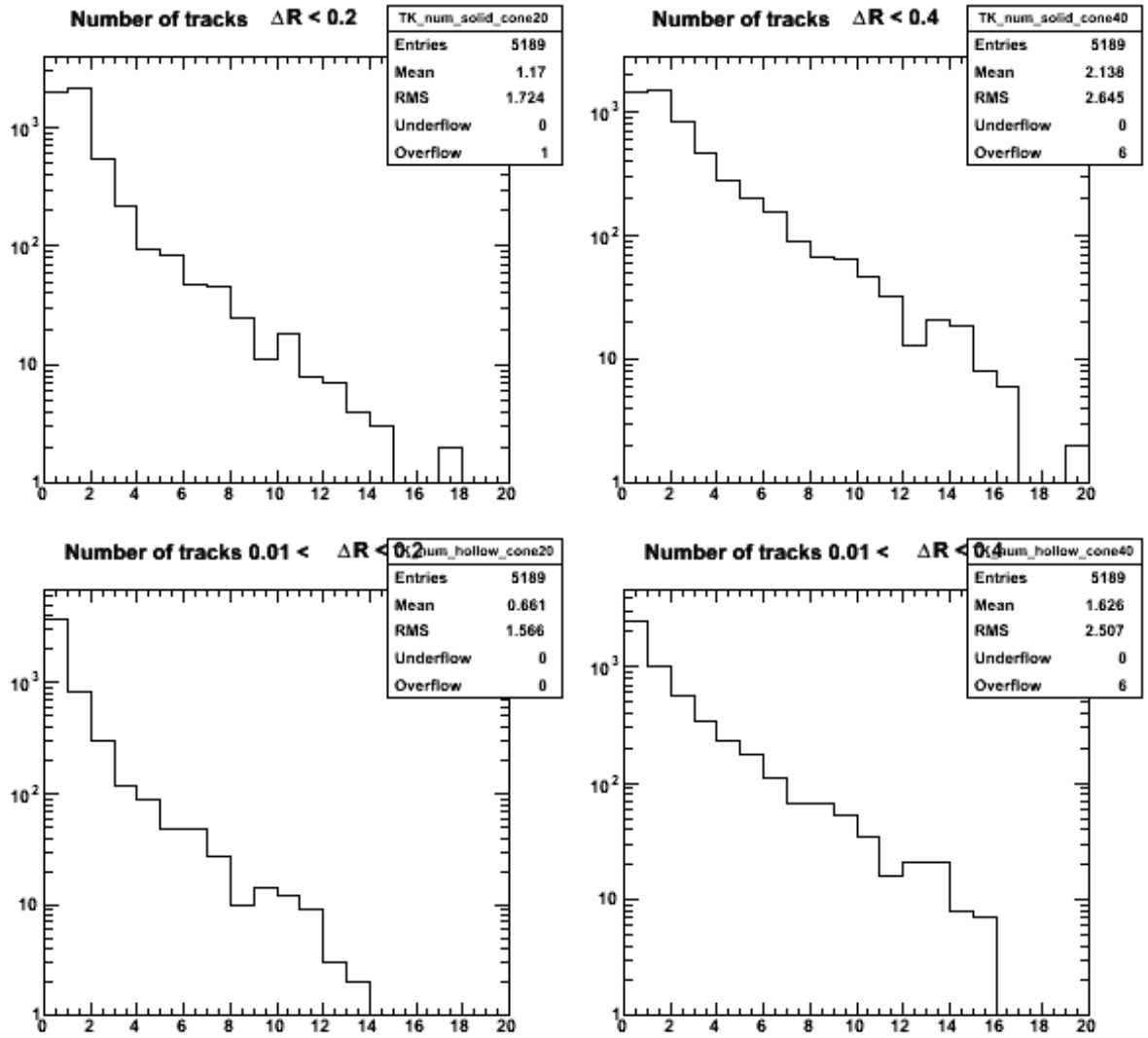
$$\sum^{\#\mathrm{trk}} \frac{E_T^{\mathrm{trk}}}{p_T^{\mu}}$$

$$\forall\ \Delta R(\mu, \mathrm{trk}) \in [\Delta R_{min}, \Delta R_{max}]$$



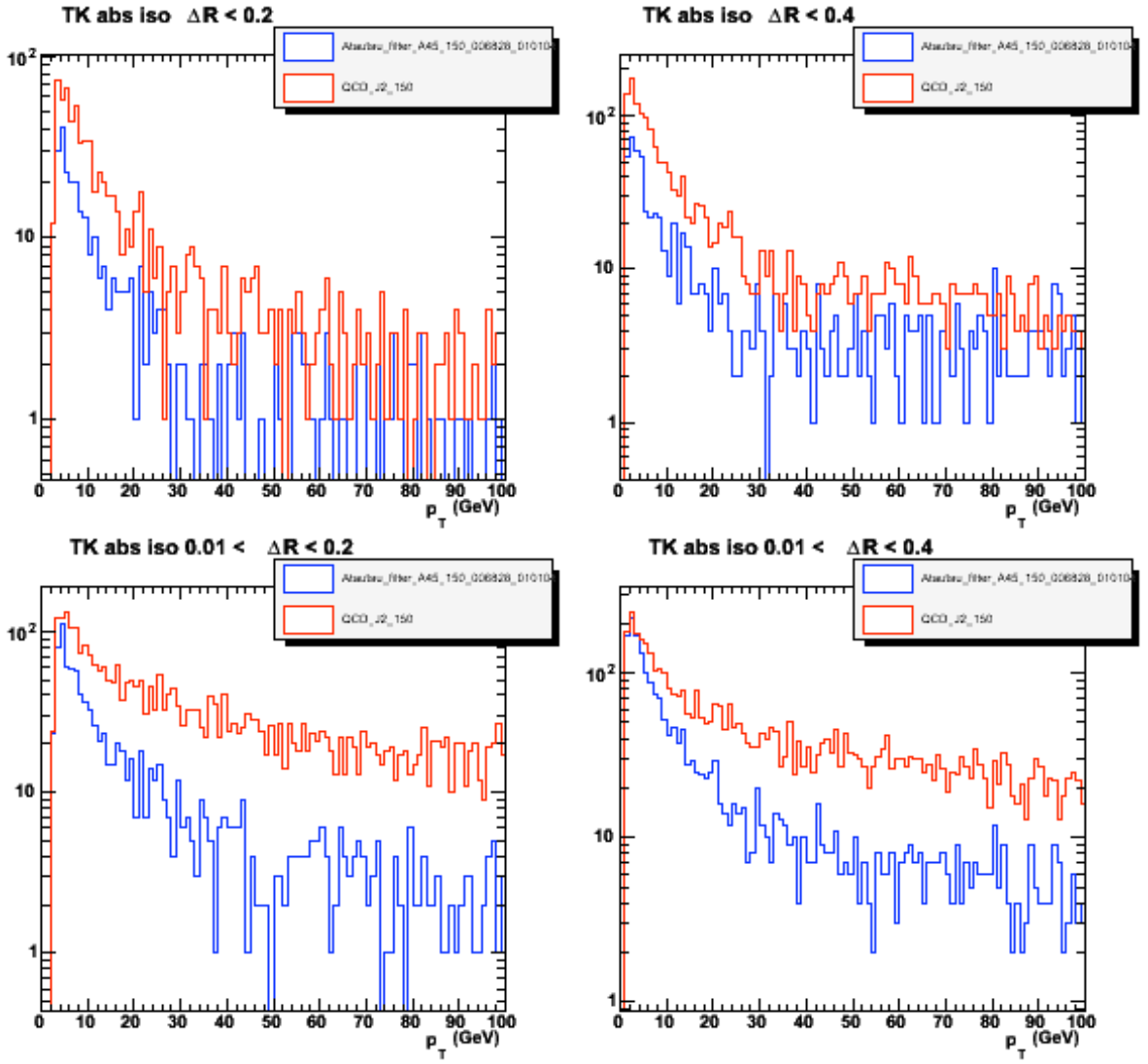
# Number of tracks

- Number of tracks in a ΔR cone from the Trk container
- Could we do a cut on the number of tracks?



# Track absolute isolation (Αττ vs QCDJ2)

- Not correctly normalized



# Track relative isolation (Αττ vs QCDJ2)

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