Calibration of the Jet Vertex Tagger algorithm in the ATLAS detector

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Pile Up Tagging

Defined as the average number of particles interactions per bunch-crossing.

PU jets come from two different sources

- Stochastic: Come from different interactions.
- QCD: Is principally a single vertex contaminated by a different one.

We are interested in jets originating from the hard scatter vertex.

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With increasing number of collisions per bunch crossing PU tagging becomes more crucial.

NN – based Jet Vertex Tagger (NNJVT) is used to identify and reject PU.

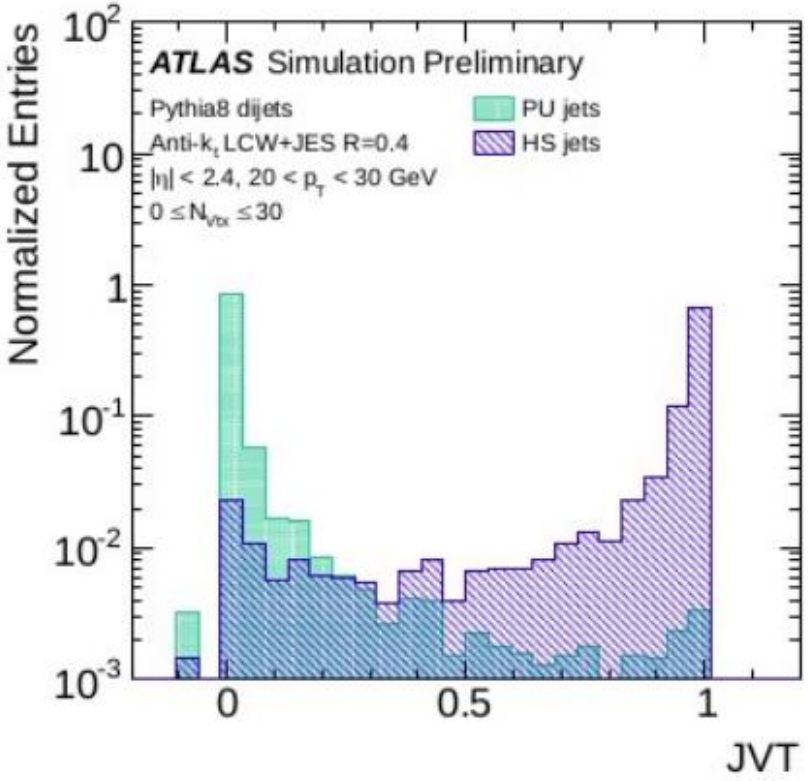
Jet-Vertex-Tagger is a discriminant used to remove pile up jets.

- Is a two-dimensional Likelihood build from Rp_T and $corrJVF$.

$$R_{\mathrm{pT}} = \frac{\sum_k p_T^{trk_k}(PV_0)}{p_T^{jet}}$$

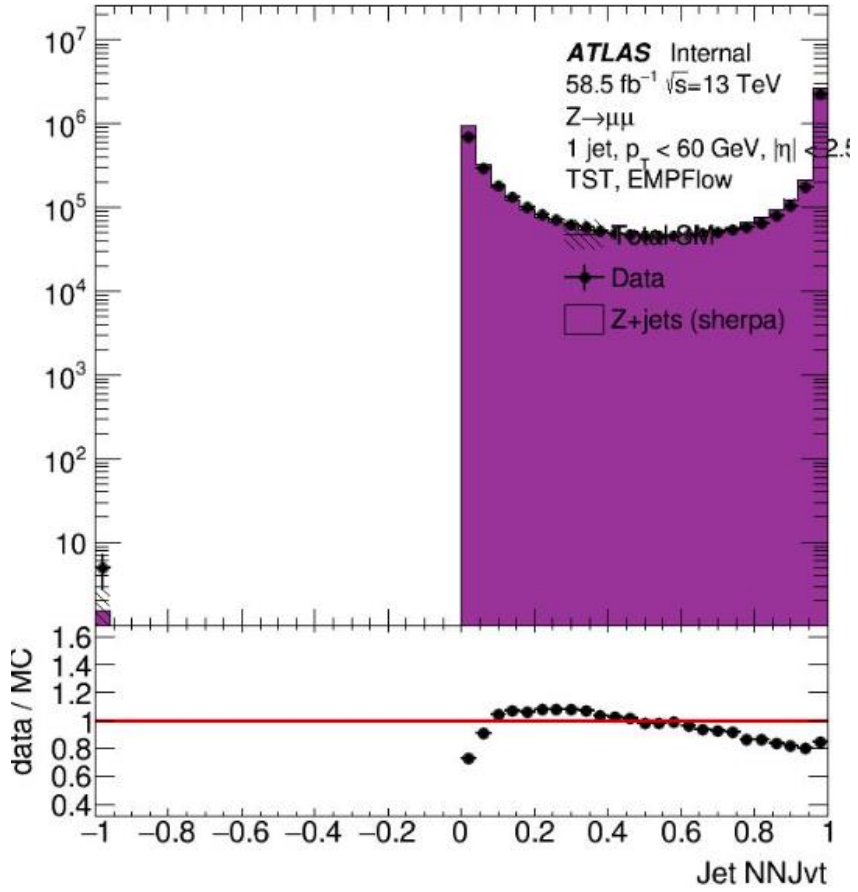
$$\mathrm{corrJVF} = \frac{\sum_k p_T^{trk_k}(PV_0)}{\sum_l p_T^{trk_l}(PV_0) + \frac{\sum_{n\geq 1}\sum_l p_T^{trk_l}(PV_n)}{k \cdot n_{trk}^{PV_n}}}$$

- If large → HS, if low→ PU



NN JVT

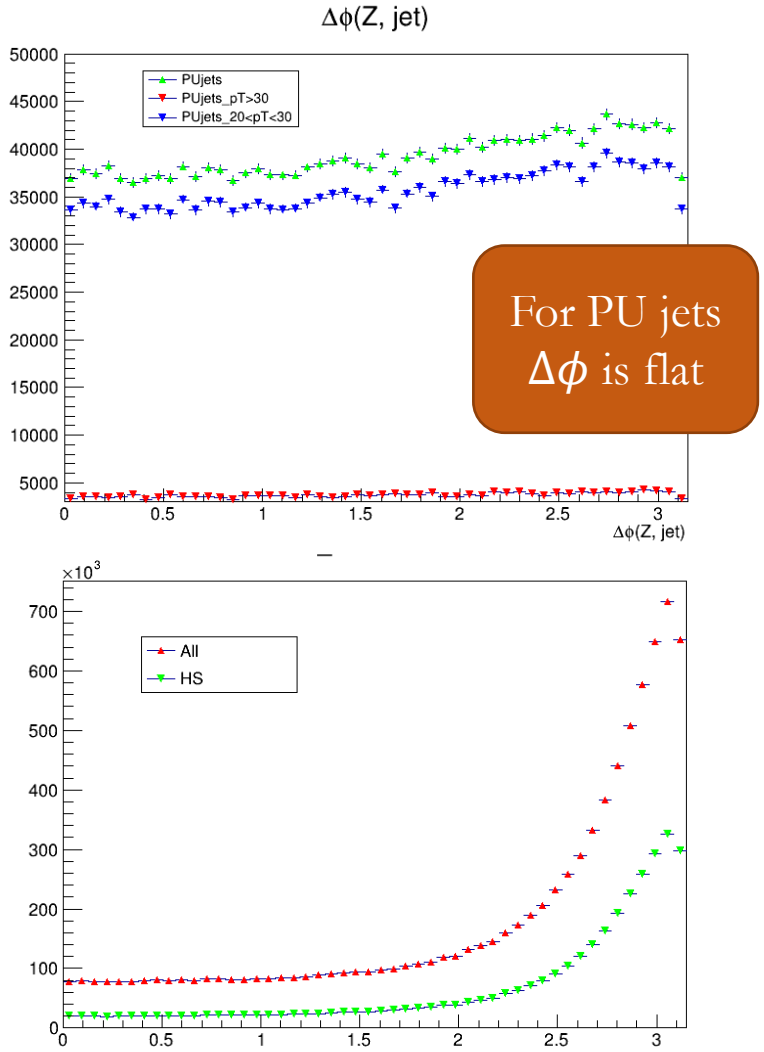
- Is an adaptive Multi-Vertex Finder
- Use ΔR between closest truth jet and reconstructed jet to distinguish between HS and PU jets.



Measurement region

To remove PU jets from HS events we are using $\Delta\phi(Z, jet)$

- HS events are enriched by $\Delta\phi > 2.8$
- PU events are enriched by $\Delta\phi < 1.2$



For PU jets $\Delta\phi$ is flat

Outlooks

Complete the analysis to apply it into R22.

Deriving efficiency scale factors.

Deriving corresponding uncertainties for pileup jet taggers.

Thanks!