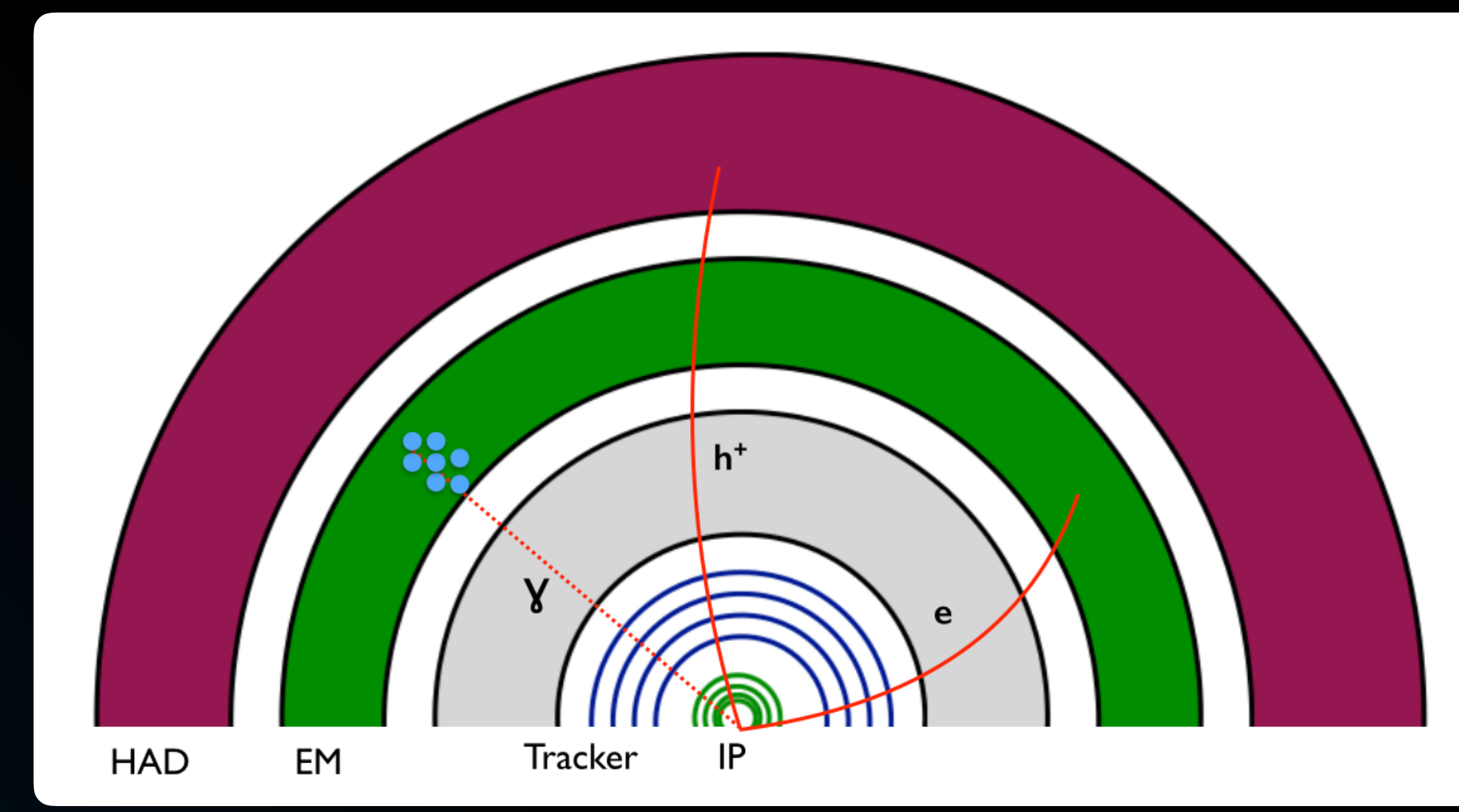


Performance of Jets and Missing Transverse Energy Measurements using Particle Flow in ATLAS

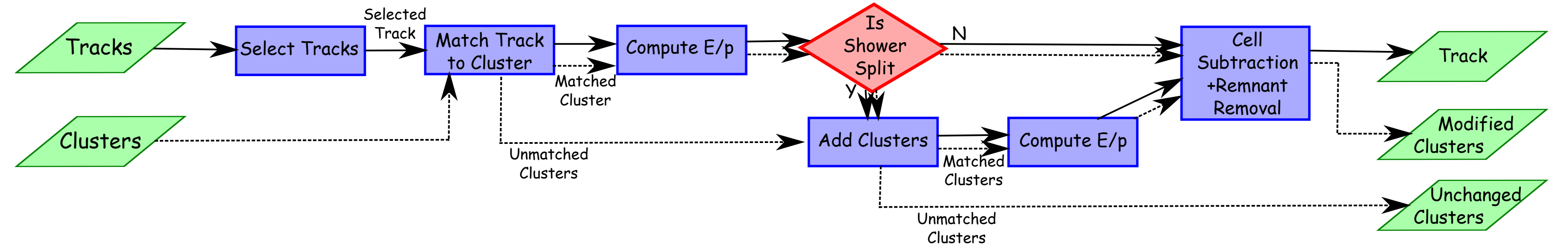
Ian Brock
University of Bonn
On behalf of the ATLAS Collaboration



Particle flow

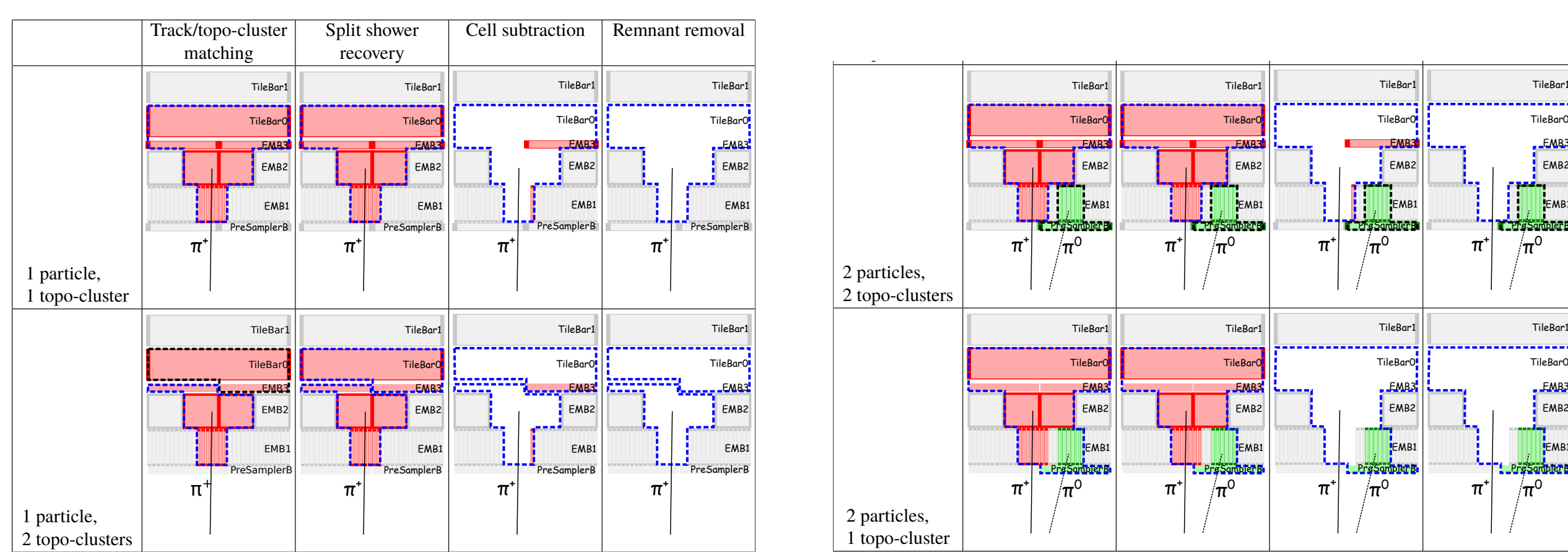
- Combine tracking and calorimeter measurements to reconstruct jets
- Tricky part is subtracting correct amount of energy from calorimeter
- Suppress pile-up by using only tracks that come from the primary vertex

ATLAS algorithm



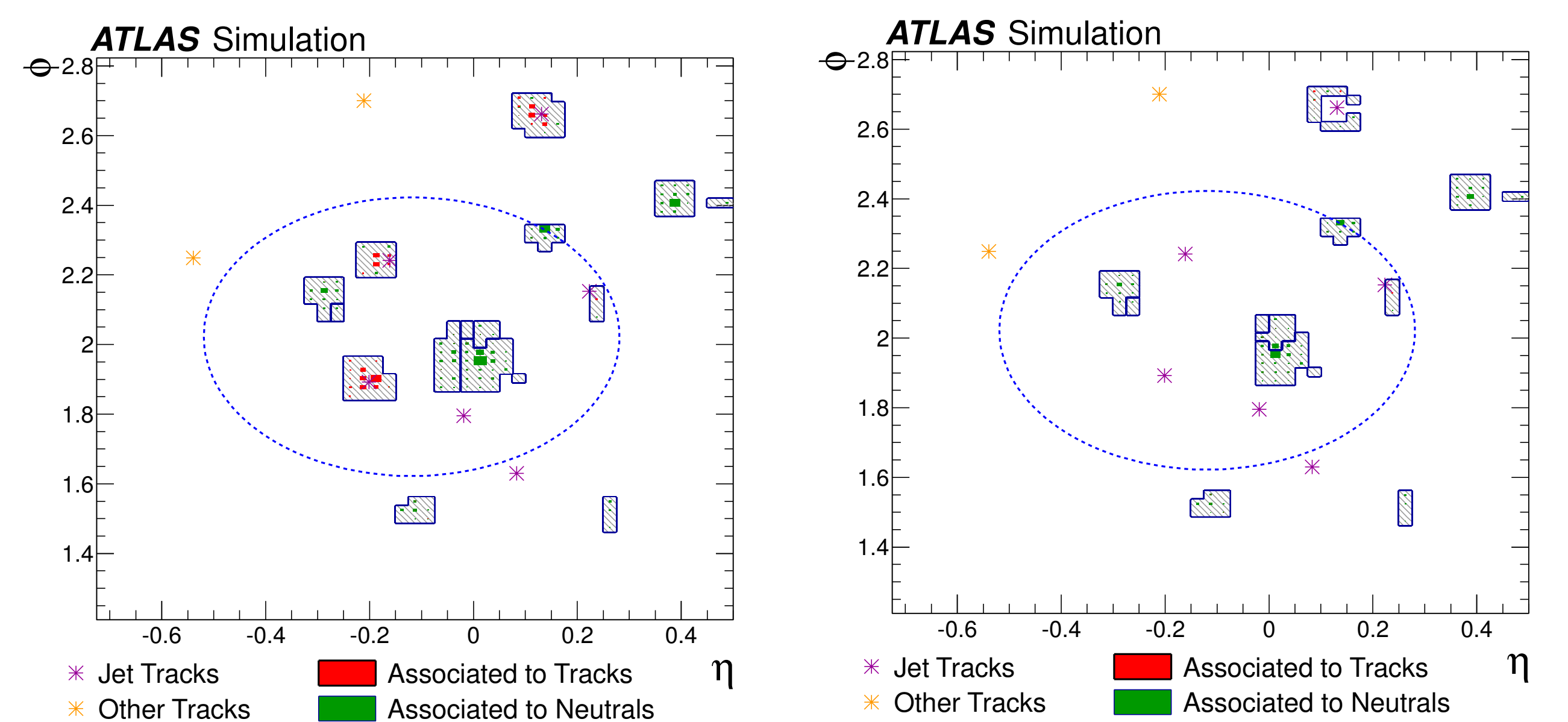
The idea

- Find energy deposited by charged particle, subtract it and replace with the track momentum

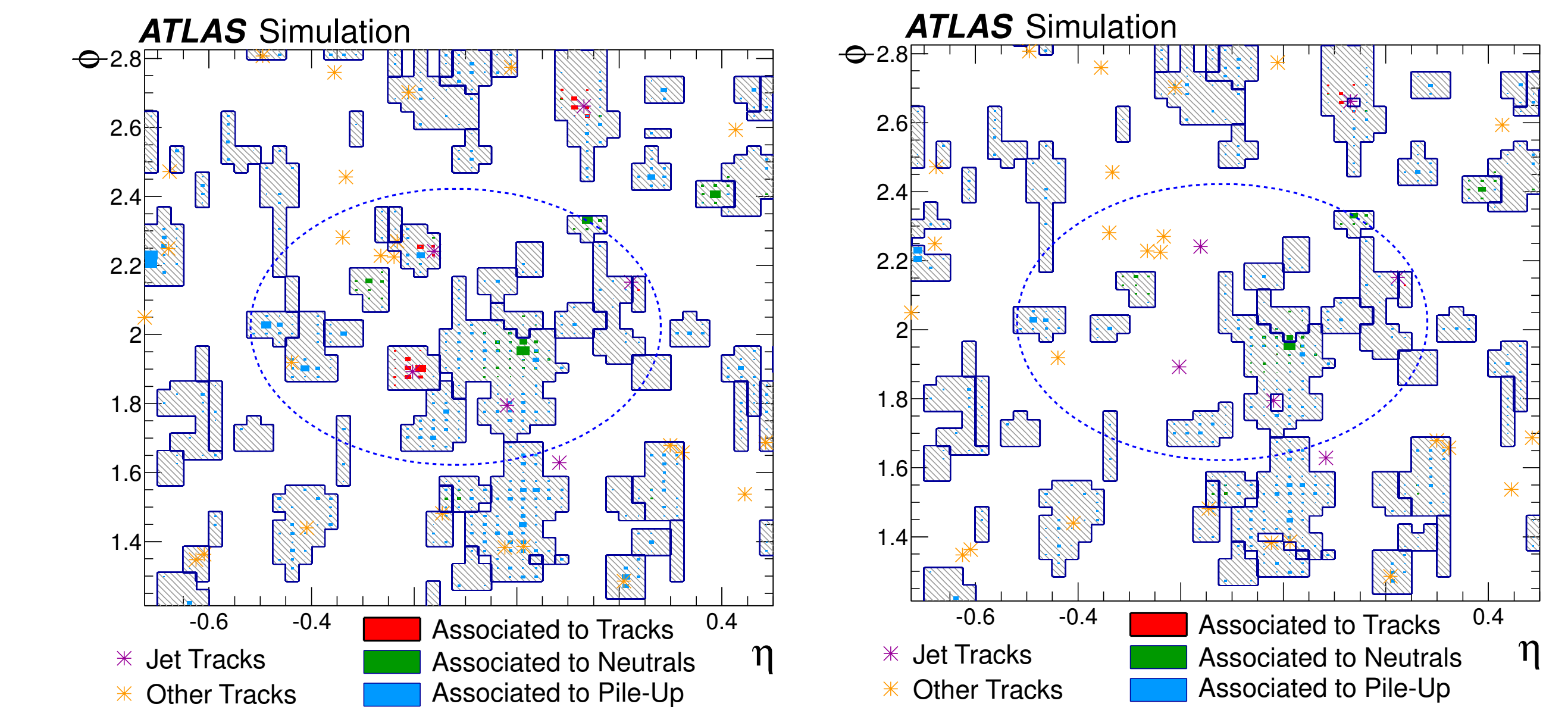


How well does it work?

- Without pile-up

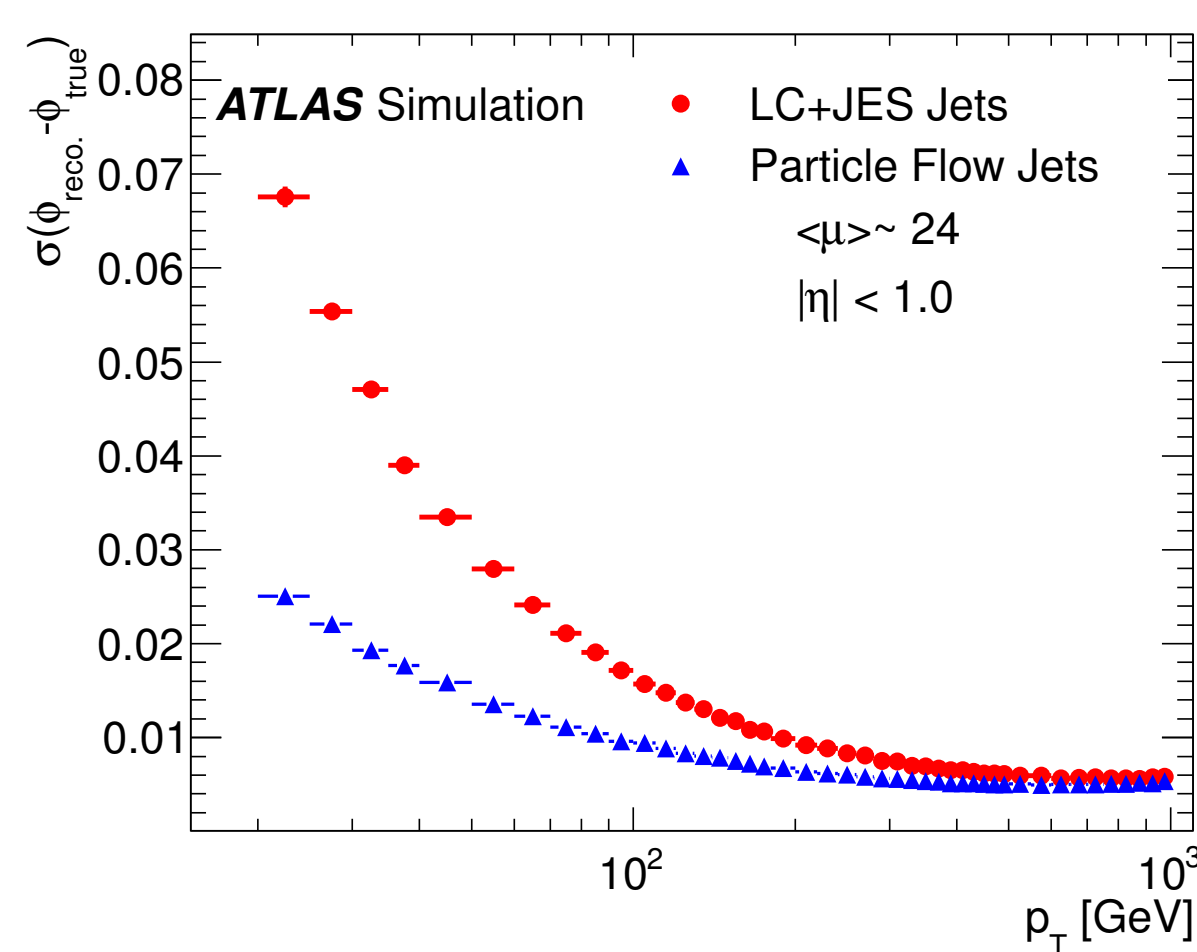


- With pile-up



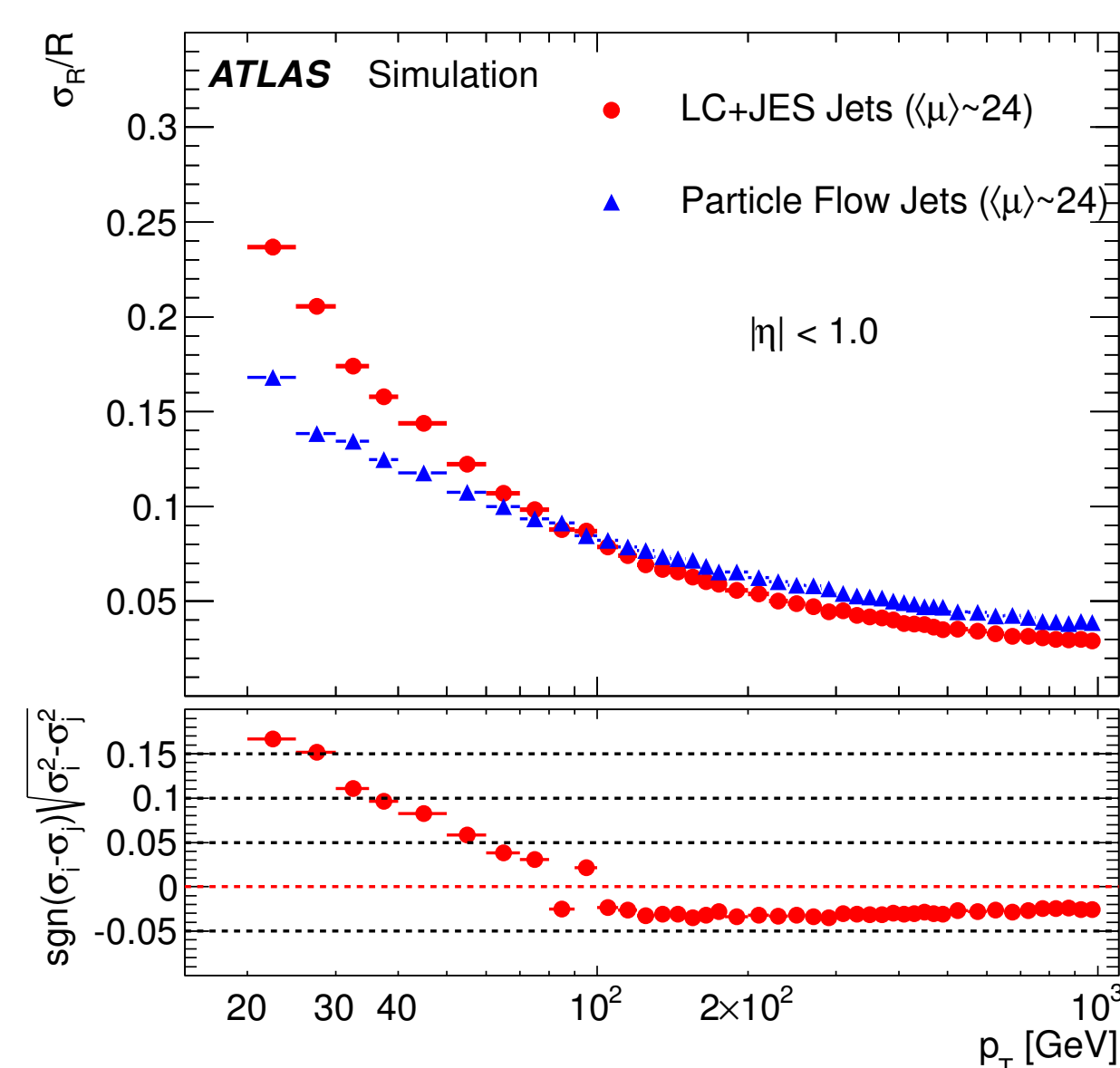
Resolution improvements

- Angle



Similar improvement seen for $\Delta\eta$

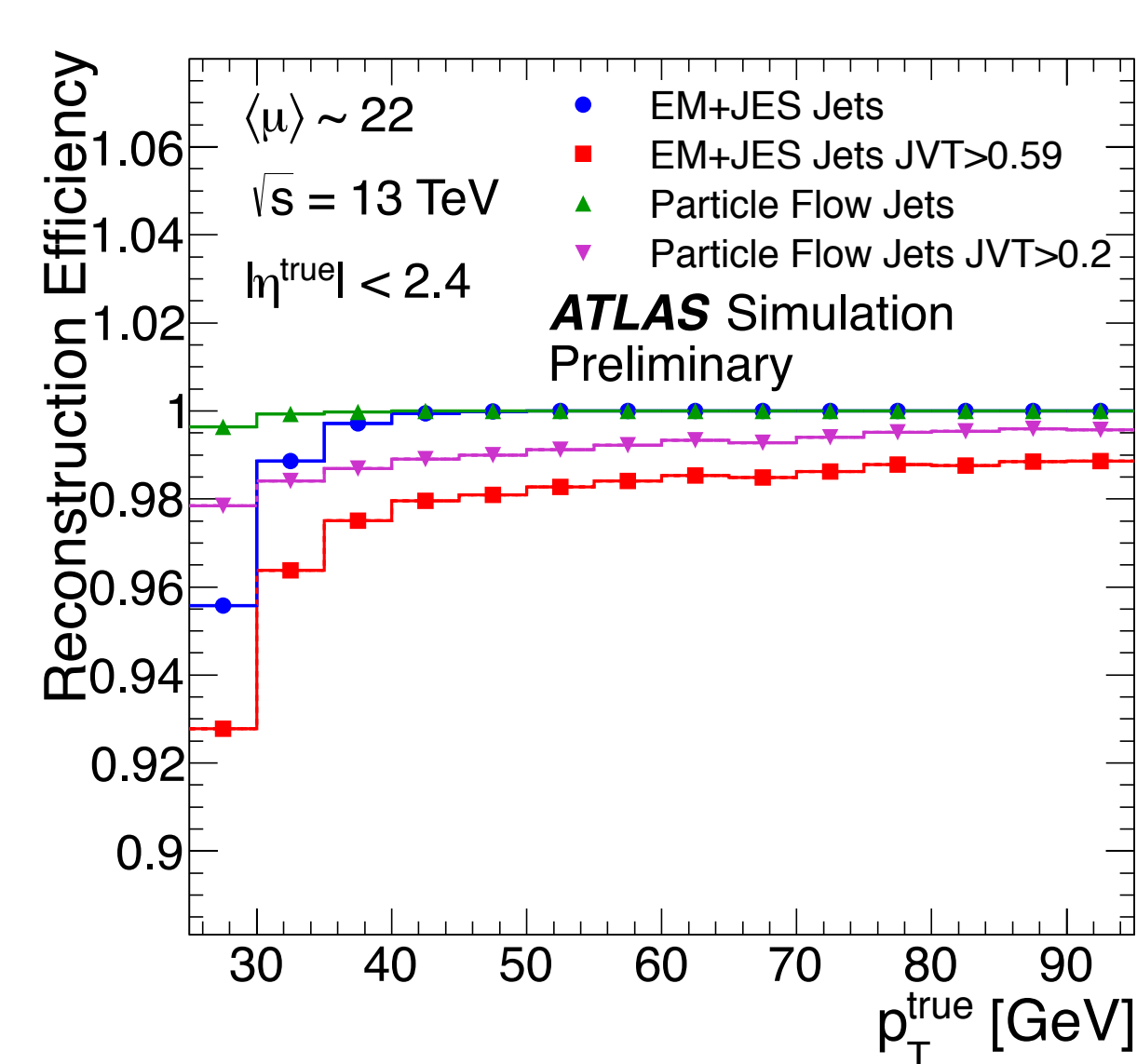
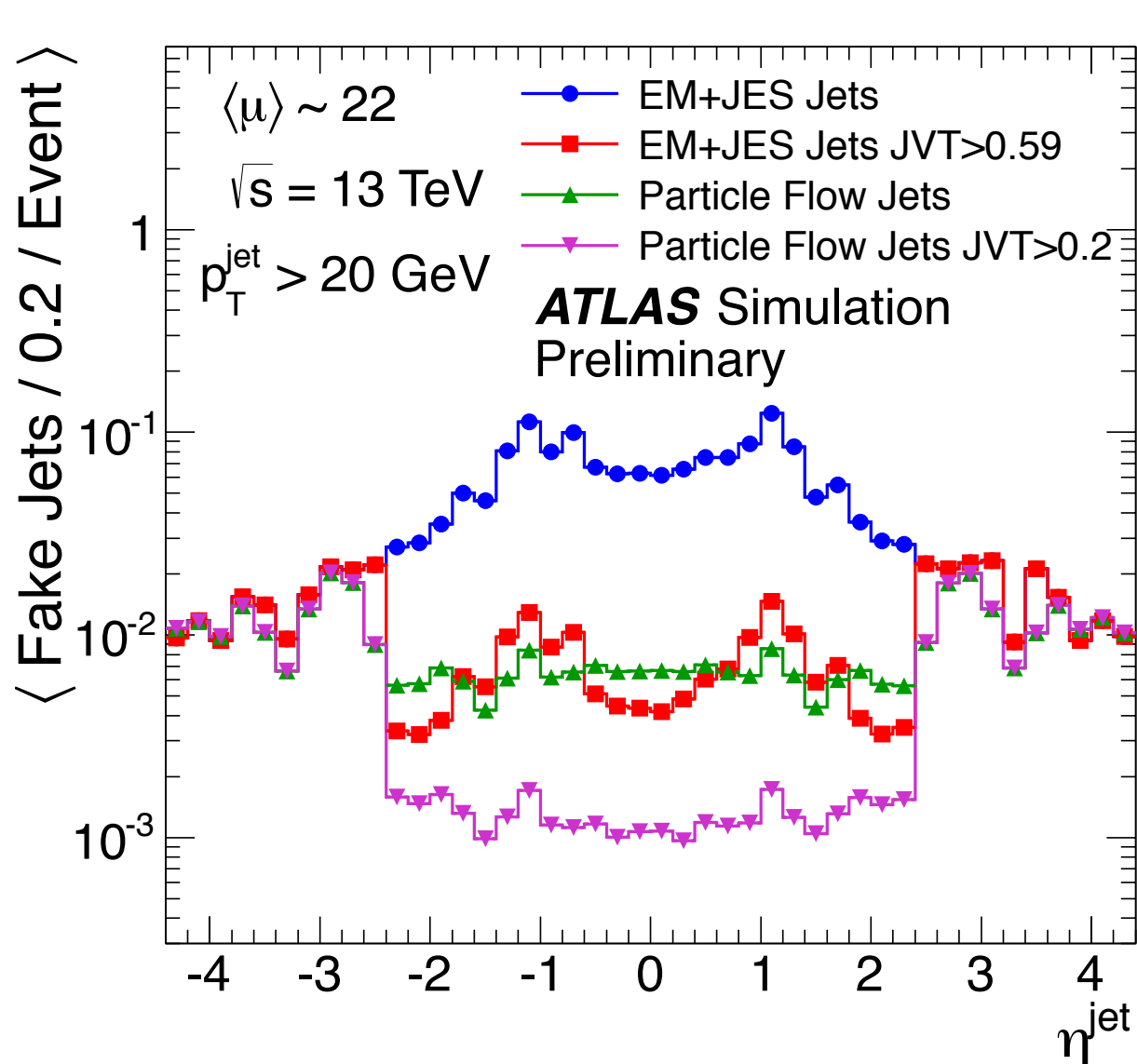
- Energy



Dijet events

Pile-up suppression improvements

Dijet events

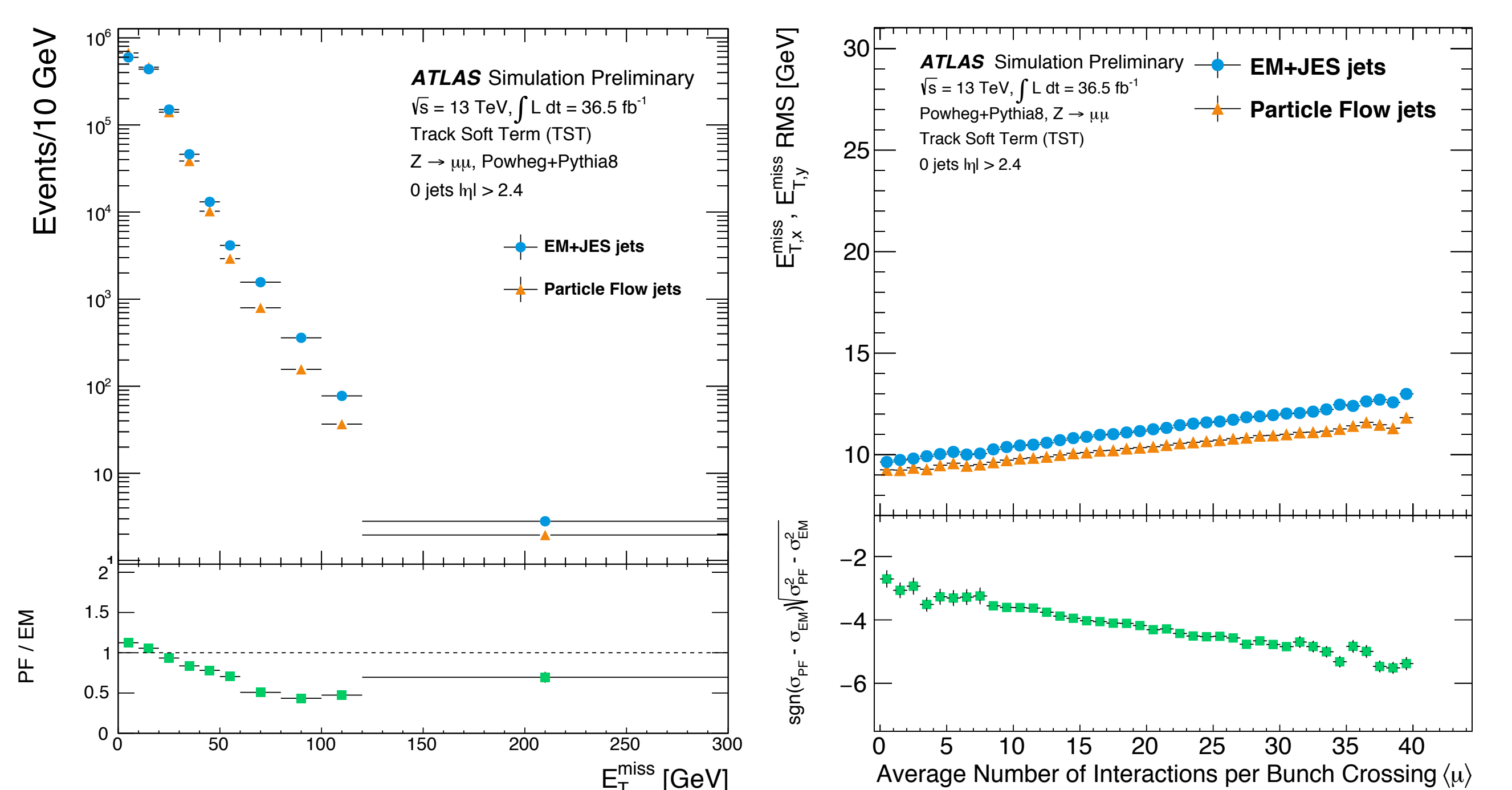


Current status

- Improved algorithm for high p_T jets implemented for Run 2
- Particle flow jets are available for analysis
- Final calibrations and evaluations of systematic uncertainties ongoing
- Detailed studies in the physics groups with different event selections recently started

E_T^{miss} with particle flow

- Use $Z \rightarrow \mu\mu$ events (should have no real E_T^{miss}) to check performance
- Important to handle all contributions (jets (hard and soft), leptons, ...) consistently
- Improved resolution and pile-up dependence seen



REFERENCES

- Jet reconstruction and performance using particle flow with the ATLAS Detector - arXiv:1703.10485 (accepted by EPJ C)
- EM+JES and PFlow Pile-Up jet rate - <https://atlas.web.cern.ch/Atlas/GROUPS/PHYSICS/PLOTS/JETM-2017-006/>
- Particle flow based missing transverse energy - <https://atlas.web.cern.ch/Atlas/GROUPS/PHYSICS/PLOTS/JETM-2017-007/>