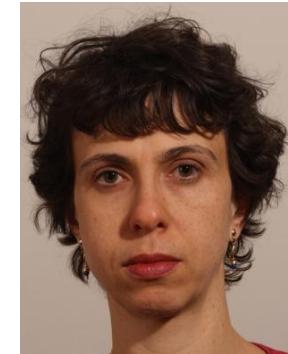


Performances of pile-up mitigation techniques for jets in pp collisions with the ATLAS detector

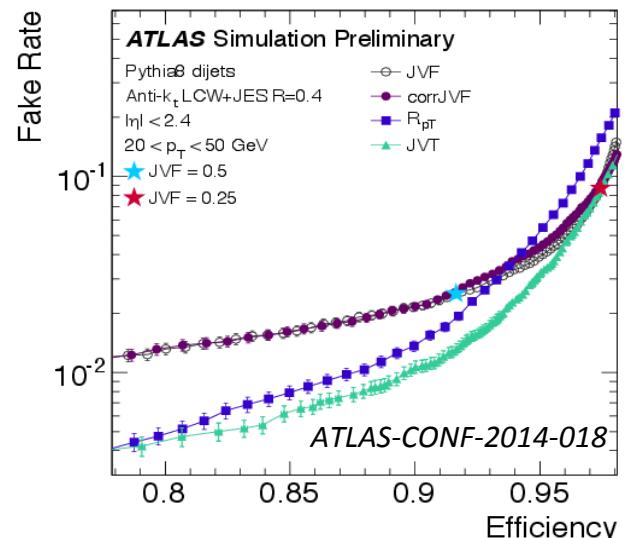
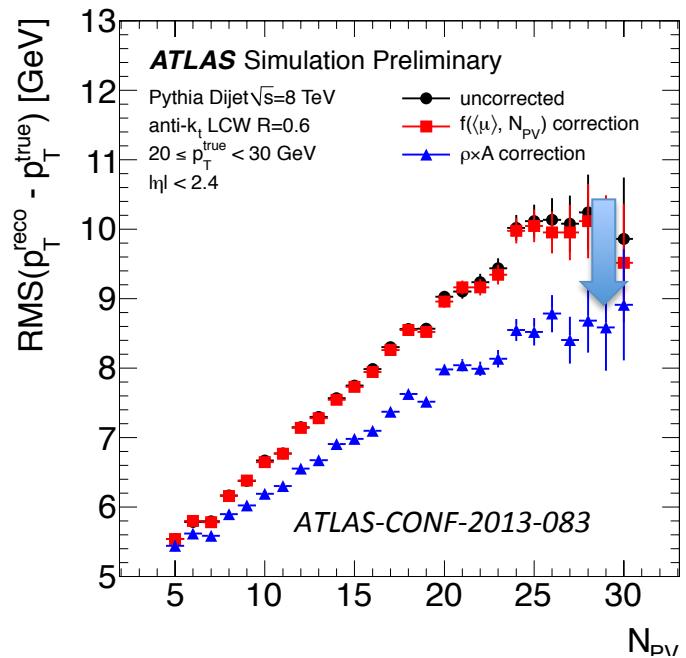
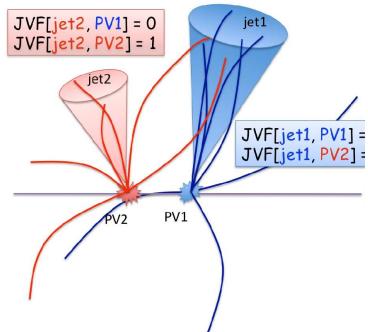
Marianna Testa
for the ATLAS Collaboration



Pile-up subtraction & Pile-up jet tagging

The large rate of multiple simultaneous proton-proton interactions, or **pile-up**, generated by the Large Hadron Collider in Run I required the development of *many new techniques* to mitigate the adverse effects of these conditions

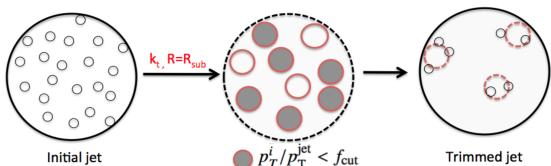
- The **Jet Area correction** estimates the average pileup p_T density in the event and corrects the jet p_T according to its area $p_T^{corr} = p_T - \rho \times A_T$
 \rightarrow *Reduced dependence on pile-up of the energy resolution*
 - Pile-up jet tagging** techniques use tracking information and
 - associate tracks to jets
 - tag jets based on the track origin
- \rightarrow The resulting **Jet Vertex Tagger (JVT)** shows **1% fake rate** from pile-up jets for a **hard-scatter jet efficiency of 90%**.



Pile-up suppression with jet substructure

Jet substructure techniques are designed to improve the mass resolution of hadronically decaying boosted particles.

- **Jet Trimming** techniques reduce effective jet area rejecting low-momentum sub-jets arising from pile-up.



→ Jet Mass dependence on pile-up strongly reduced

- At High Luminosity LHC **Jet trimming combined with Jet Area correction** provides jet mass stability wrt to pile-up conditions

