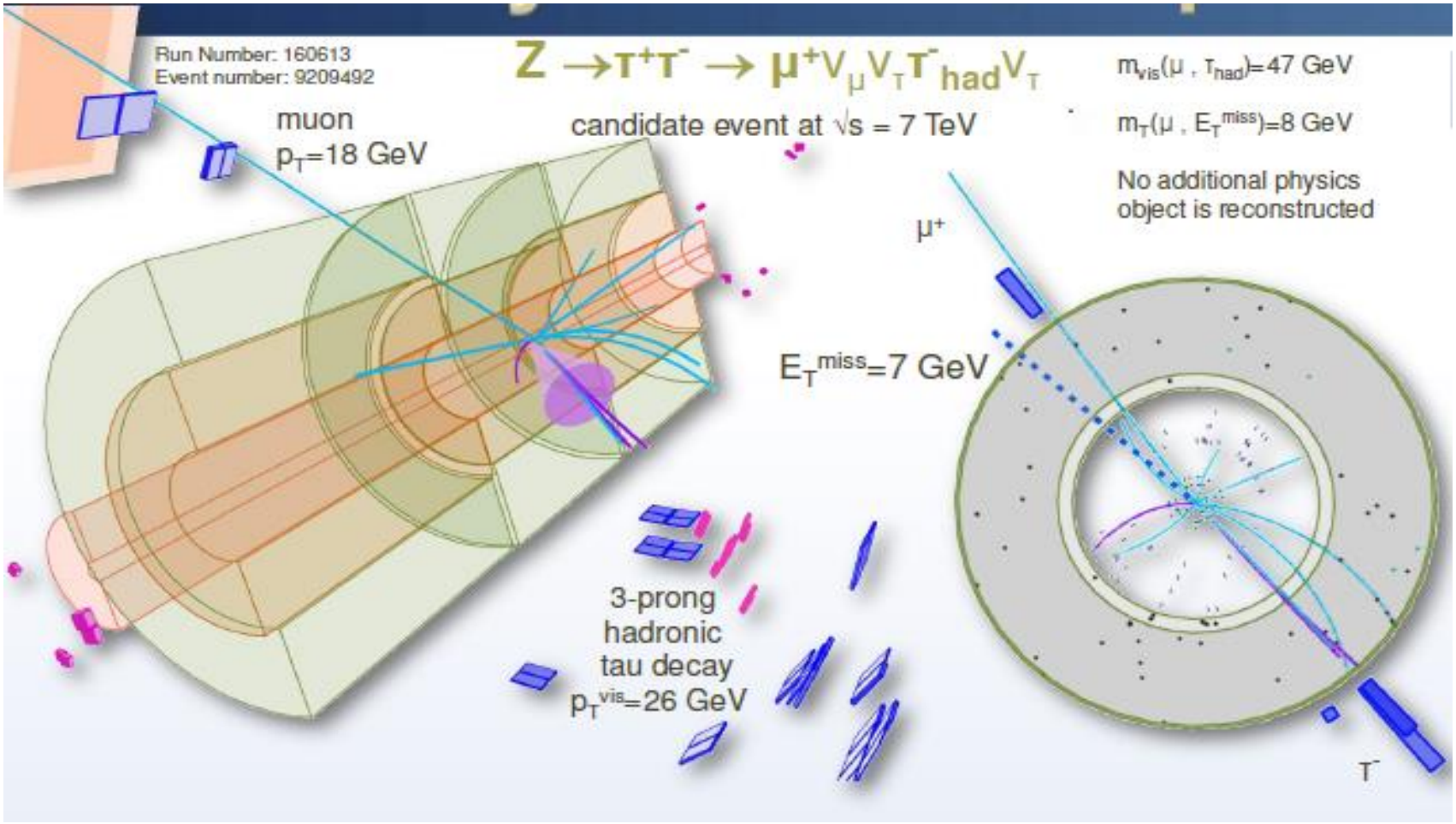
Hadronically decaying tau leptons

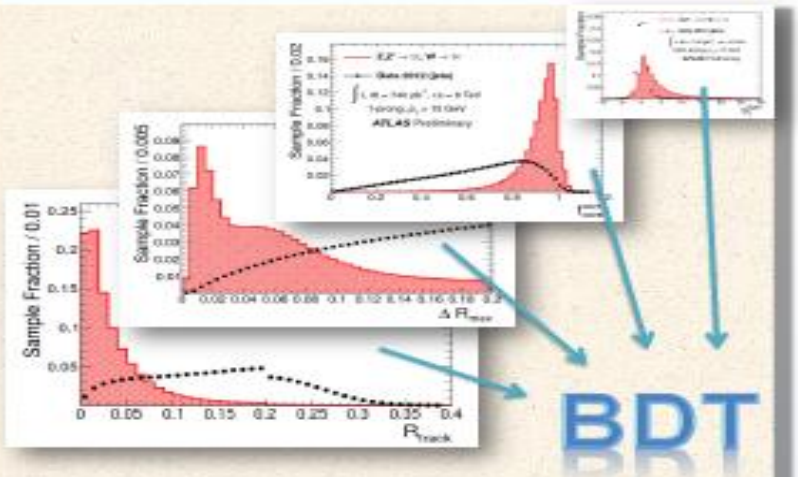


Hadronically decaying tau leptons

Reconstruction

- ✓ topological clusters made of calorimeter cells & calibrated using the Local Hadron Calibration (LC) scheme
- ✓ anti-kt R=0.4 jet finder
- ✓ associate tracks within the tau *core cone* $\Delta R \leq 0.2$
- ✓ identify the best vertex hypothesis for the τ_{had} candidate
- ✓ sum up clusters within $\Delta R \leq 0.2$ around the barycenter

Identification



- ❑ Multivariate technique (Boosted Decision Trees) to identify hadronic taus
- ❑ Calorimetric and tracking shower shapes to discriminate hadronic tau decays from *QCD jets* and *electrons*
- ❑ Cut-based *muon-veto* to reject muon track and associated calorimeter cluster

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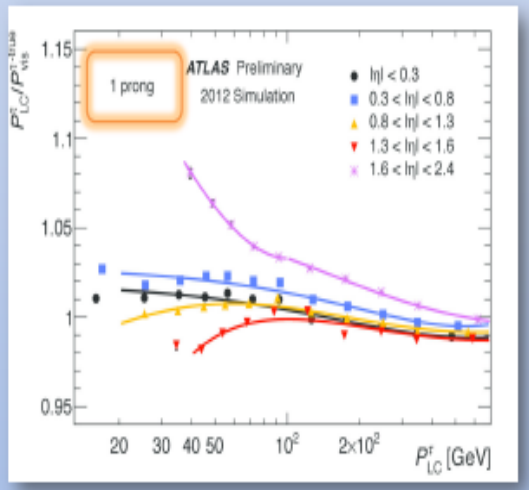
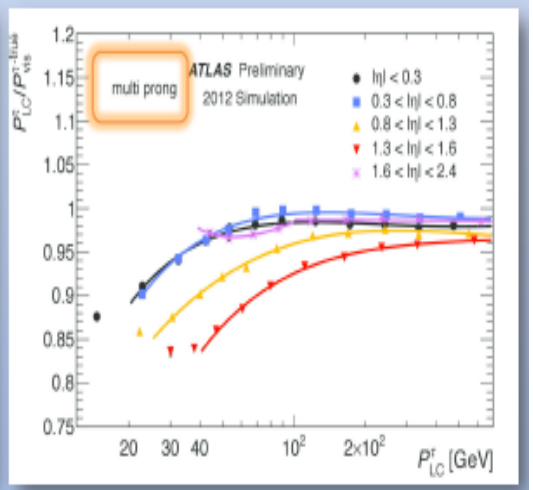
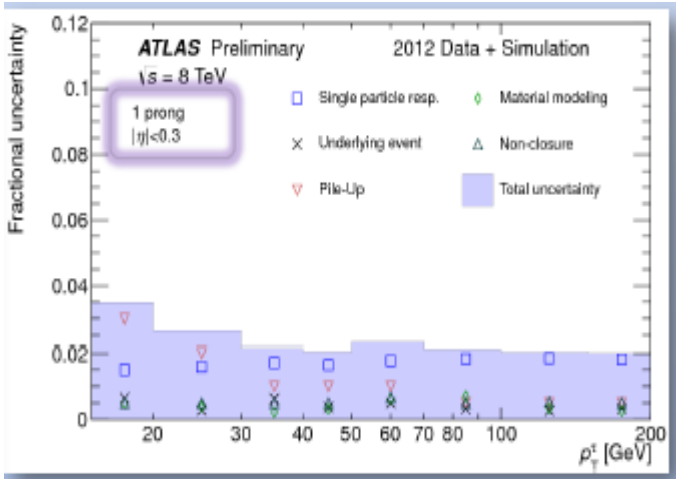


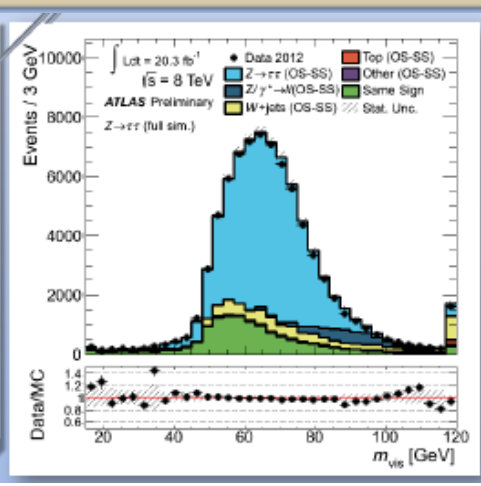


Response curves as a function of the reconstructed τ_{had} at the LC scale



Individual and combined tau energy scale (TES) uncertainties in the central region

In-situ analysis provides a data-driven TES measurement using the reconstructed $Z \to \tau\tau$ visible mass peak



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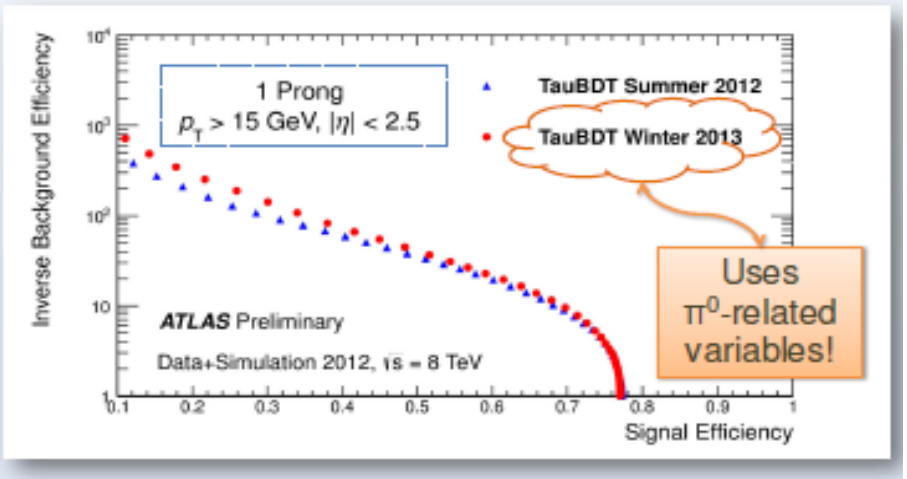

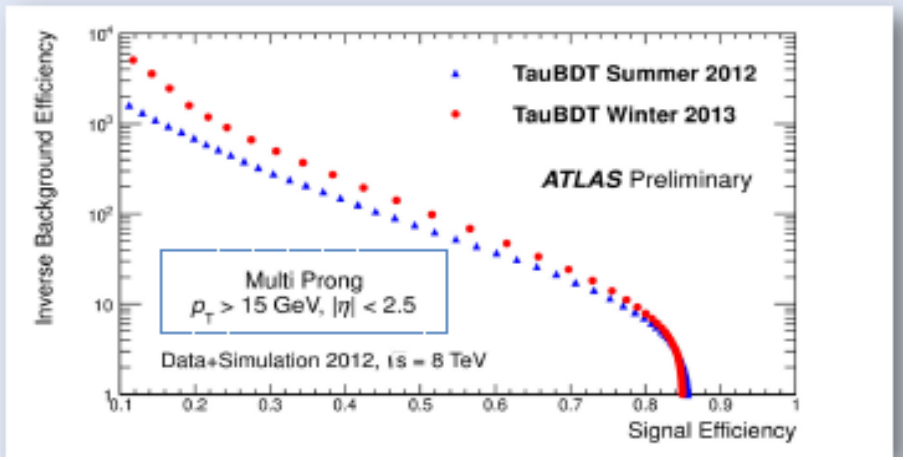

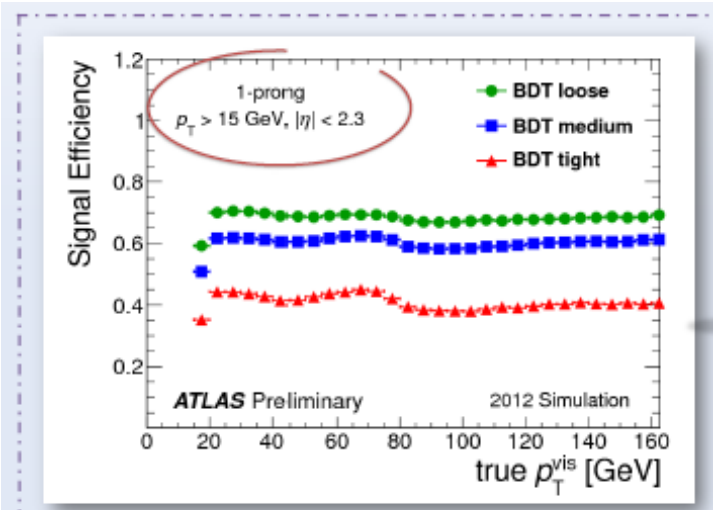

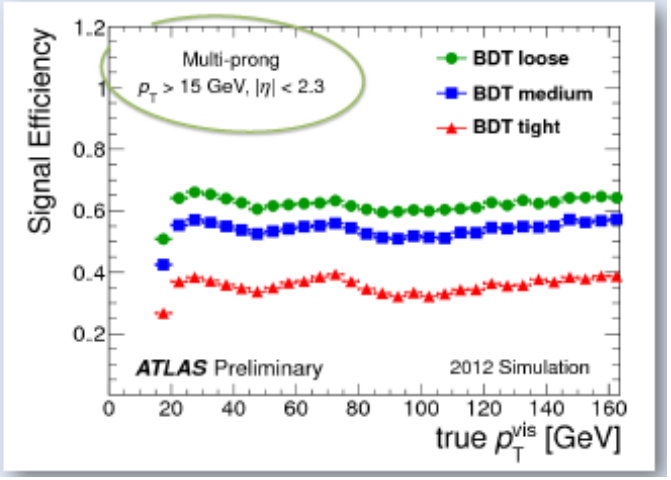

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