Jet Energy Scale and Resolution Measurements with Legacy Run 2 CMS Data

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Introduction
Reconstructed jets are corrected up to the level of jets clustered from stable (\(|r|>1\text{cm}\)) and visible (excluding weakly interacting neutral particles) final state particles, referred to as particle (ptcl) jets.

Pileup Offset Subtraction
Additional pp interactions in the same and neighbouring bunch crossings produce event pileup. This leads to unwanted energy offset in reconstructed jets. Pileup offset in simulation is calculated by taking the average difference in neighbouring bunch crossings produce event residuals (RC) are derived with calibration. The jets are calibrated sequentially with:

- pileup offset subtraction
- detector response correction from simulation
- residual corrections for differences between data and detector simulation
- optional corrections for jet flavour composition

Response Correction
Monte Carlo truth jet energy response is defined as \(R = \frac{\text{MC}}{\text{Data}}\). R is derived in bins of \(p_T\) and \(\eta\).

- \(\eta\)-Dep. Residual Correction
Residual correction of jet response normalised to the response in the barrel derived in bins of \(\eta\) and \(p_T\) using dijet events in data and simulation.

- \(p_T\)-Dep. Residual Correction
Data-to-simulation comparison for the jet response dependence on \(p_T\).

References