Jet Calibration

- Jet calibration is a multistep process that corrects the jet kinematics.

  - Numerical inversion: Calibration based on simulations of the calorimeters energy response (see figure below) [5].

  - In situ calibration: Data based calibration inherited from pp studies. It accounts for differences between data and MC and is derived using Z-jet and γ-jet balance studies [5].

  - Cross calibration: MC and data based calibration is applied to HI jets to account for differences between the HI and pp jet reconstruction software [6].

  - The cross calibration verified in a γ-jet study (shown on the right) [7].


Performance

- The performance of the jet reconstruction is evaluated by calculating the jet energy scale (JES) and jet energy resolution (JER). This is the mean and width of the response \(p_{T,\text{true}}/p_{T,\text{meas}}\) in MC samples [3].

Heavy Ion Jet Reconstruction

- Heavy Ion events involve a massive underlying event that requires a unique reconstruction procedure [2,3].

  - Anti-k algorithm
  - Calorimeter towers
  - Flow modulation (R0, R0)
  - Reconstructed HI jets

Uncertainties

- The cross calibration procedure for HI jets allows the baseline HI JES and JER uncertainties to be inherited from the pp jets (shown below) [6].

  - HI specific JES uncertainties due to flavor response, flavor fraction, and cross calibration are included [8].

  - There is an additional centrality dependent uncertainty based on jet modifications in the Pb+Pb environment (0.5% in most central collisions) [8].

  - The HI JER uncertainties are derived using the relative resolution of HI jets to pp jets [6].

  - The uncertainties on the HI jet spectra are shown on the right [3].

  - The JES has the largest contribution (7 - 10%) to the uncertainty in central Pb+Pb [3].

References: