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Performance of the CMS Zero Degree Calorimeters in the 2016 pPb run

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Two neutral particle detectors, Zero Degree Calorimeters (ZDCs) at the LHC-CMS experiment, cover the $|\eta| > 8.5$ region. The ZDCs are Cherenkov calorimeters that use tungsten as the absorber and quartz clad quartz fibers as the active medium. They have a five element electromagnetic section followed by a hadronic section divided into four depth segments. For the 2016 pPb run, the ZDCs were calibrated using test beam data and the single spectator neutron peak at 2.56 TeV. Peaks corresponding to 1, 2 and 3 neutrons are visible in the ZDC total signal distribution. Then the effect of pileup is corrected by a Fourier deconvolution method. Using this, the spectator neutron number distribution can be unfolded by a linear regularization method. This information serves as a strong constraint to models of pPb collisions and has the potential to produce an unbiased measure of centrality in pPb collisions.

Secondary topics

Algorithms, data processing methods

Applications

Experience with current calorimeter at the energy frontier

Primary topic

Cherenkov

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