

# Measurement of the Energy Response of the ATLAS Calorimeter to Charged Pions from tau-lepton Decays in Run 2 Data

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The measurement of the ATLAS calorimeter response  $E/p_T$  is performed for single charged pions with a transverse momentum ( $p_T$ ) ranging from 10 to 300 GeV using 139 fb<sup>-1</sup> of proton-proton collision data at  $\sqrt{s}=13$  TeV taken in RUN 2 by the ATLAS detector of the Large Hadron Collider (LHC) [1]. The use of charged pions originating from  $\tau$ -lepton decays allows the measurement of the response of the calorimeter in the high  $p_T$  regime. In the ATLAS simulation, this response is found to be approximately 2% overestimated in the central region and 4% underestimated in the endcaps. The uncertainties in the measurements in the central region are less than 1% for  $p_T$  ranging from 15 to 185 GeV and reach 0.6% in the most precise region. A brief introduction about the ATLAS calorimeter will be presented, followed by a description of the event selection. The energy response as well as the uncertainties in the measurements will also be evaluated [2].

## References

[1] ATLAS Collaboration, The ATLAS Experiment at the CERN Large Hadron Collider

URL: <https://cds.cern.ch/record/1129811>

[2] Measurement of the Energy Response of the ATLAS Calorimeter to Charged Pions from  $W^\pm \rightarrow \tau^\pm(\rightarrow \pi^\pm \nu_\tau) \nu_\tau$  Events in Run 2 data : CERN-EP-2021-147

URL: <https://cds.cern.ch/record/2778857>

## Abstract Category

Instrumentations & Detectors

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