Contribution ID: **286** Type: **Poster**

Energy response of ATLAS Tile Calorimeter to isolated muons

Thursday 18 July 2024 20:40 (20 minutes)

The ATLAS hadronic Tile Calorimeter (TileCal) is one of the sub-systems of the ATLAS detector installed at the LHC. The calorimeter is composed of alternating iron plates and plastic scintillating tiles. Our study aims to determine the azimuthal uniformity of the energy response and intercalibration of the TileCal longitudinal layers using isolated muons. The muons from the decay of the W bosons are selected. This particular decay is chosen because of its high cross-section and clean signature. The response of the individual TileCal cells is quantified by measuring the ratio of the energy deposited by a muon in a given cell (dE) to the corresponding path length (dx). The distribution of dE/dx follows the well-known Landau distribution. To cancel out various systematic effects, our analysis uses the truncated mean of the dE/dx distribution obtained from the data divided by the truncated mean from the MC simulation samples. Results using 2022 and 2023 data will be shown.

Alternate track

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Yes

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Session Classification: Poster Session 1

Track Classification: 12. Operation, Performance and Upgrade (incl. HL-LHC) of Present Detectors