Contribution ID: **188** Type: **Poster**

Calibration of the HADES Electromagnetic Calorimeter with Leptons from Au+Au Collisions

Tuesday 11 November 2025 18:04 (2 minutes)

The Electromagnetic Calorimeter (ECAL) is a key subdetector of the HADES (High Acceptance Di-Electron Spectrometer) experiment at SIS18, GSI Darmstadt. Its main purpose is the measurement of photons and electrons, enabling studies of neutral meson production, dielectron sources, and improved electron–hadron separation. A dedicated calibration campaign was performed using leptons from Au+Au collisions at 800, 400, and 200 AMeV, where precise momentum determination from the tracking detectors (MDC) and particle identification with the RICH, TOF, and RPC subsystems provided a clean reference for the ECAL response. The correlation between reconstructed electron momentum and calorimeter amplitude enabled the extraction of energy calibration functions for individual modules and the determination of the detector's resolution across the full acceptance. Looking ahead, the calibrated ECAL will play a central role in the upcoming HADES pion-induced reactions on CH_2 and C targets, where it will be essential for reconstructing third-baryon and hyperon resonance decay channels in an energy scan from $\sqrt{s}$ = 1.67 to 1.79 GeV.

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Session Classification: Poster

Track Classification: 8. New facilities and instrumentation