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The Calibr-A-Ton: a novel method for calorimeter energy calibration

The energy calibration of calorimeters at collider experiments, such as the ones at the CERN Large Hadron Collider, is crucial for achieving the experiment's physics objectives. Standard calibration approaches have limitations which become more pronounced as detector granularity increases. In this paper we propose a novel calibration procedure to simultaneously calibrate individual detector cells belonging to a particle shower, by targeting a well-controlled energy reference. The method bypasses some of the difficulties that exist in more standard approaches. It is implemented using differentiable programming. In this paper, simulated energy deposits in the electromagnetic section of a high-granularity calorimeter are used to study the method and demonstrate its performance. It is shown that the method is able to correct for biases in the energy response

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