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Energy Calibration in the ATLAS Tau Trigger EMMA CASTIGLIA, Yale University, ATLAS EXPERIMENT COLLABORATION — Accurately reconstructing and calibrating the particles we measure is essential to any ATLAS analysis. Due to both detector limitations and decay process complications, the energy measured by the detector is not always the true energy of a particle. One specific particle that requires extra attention to calibrate correctly is the tau lepton. The algorithms used to reconstruct taus rely on the calorimeter clusters and the track momenta associated to the tau candidate. Due to the existence of both charged and neutral pions in the final state of a tau decay, which can overlap in the calorimeter, and various other factors, the tau energy scale is challenging to calculate. While the offline energy scale determination can use information from both the ATLAS calorimeter and tracker as inputs to a Boosted Regression Tree (BRT) algorithm, such an implementation at the trigger level is particularly difficult, where ongoing studies have been attempting to include track information into the training of the BRT. Initial results show improvements in energy calibration for high momentum taus and potential application of this method in the trigger for the HL-LHC.

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