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A Topological Clustering Algorithm for the ATLAS Level-1 Calorimeter Trigger Upgrades LUC LISI, ELLIOT PARRISH, BRIANNA STAMAS, JOHN MYERS, STEPHANIE MAJEWSKI, Univ of Oregon, ATLAS COLLABORATION — Topological clustering is the current method for calorimeter object reconstruction and suppression of multiple interactions per crossing (pileup) in the ATLAS detector at the Large Hadron Collider. We present simulation studies adopting this technique for the Level-1 Calorimeter trigger in the Phase-I and Phase-II upgrades of the trigger electronics. Applying a modified topological clustering algorithm to the 0.2x0.2 (in eta-phi) towers of the global feature extractor (gFEX), a component of the Level-1 trigger system for the Phase-I upgrade, we aim to improve the performance of the jet and missing transverse energy triggers. In particular, we focus on reconstructing so-called "boosted" objects, whose transverse momenta are large compared to their masses. The results of these studies are also applicable to a potential dedicated module with access to the full calorimeter granularity that may be implemented in the Phase-II upgrade.

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