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Pileup mitigation with graph neural networks

Mitigation of the effect of the multiple parasitic proton collisions produced during bunch crossing at the LHC is a major endeavor towards the realization of the physics program at the collider. The pileup affects many physics observable derived during the online and offline reconstruction. We propose a graph neural network machine learning model, based on the PUPPI approach, for identifying particle coming from pileup and retaining the ones from high-transverse momentum collisions. We show improvement in pileup rejection performance and energy resolution with respect to solutions currently used at the LHC.

Primary authors: Dr VLIMANT, Jean-Roch (California Institute of Technology (US));   PIERINI, Maurizio (CERN); CERRI, Olmo (California Institute of Technology (US));   ARJONA MARTINEZ, Jesus (California Institute of Technology (US)); SPIROPULU, Maria (California Institute of Technology)

Presenter: CERRI, Olmo (California Institute of Technology (US))

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