

ID de Contribution: 156

Type: Non spécifié

Machine Learning for Event Reconstruction in the CMS Phase-2 High Granularity Calorimeter Endcap

jeudi 27 novembre 2025 14:15 (20 minutes)

The High-Luminosity LHC (HL-LHC) will provide unprecedented opportunities for precision measurements and new physics searches, but it will also bring extreme challenges for event reconstruction in the dense pile-up environment. To meet these challenges, the CMS detector is undergoing major upgrades, including the replacement of its endcap calorimeters with the High-Granularity Calorimeter (HGCAL), which combines fine spatial granularity with precision timing capabilities. Fully exploiting this detector requires reconstruction strategies that go beyond traditional approaches. A dedicated framework, The Iterative CLustering (TICL), is being developed within the CMS Software (CMSSW) to reconstruct particle showers by integrating information from HGCAL and other subdetectors such as the Tracker and the MIP Timing Detector. Machine Learning (ML) plays a central role in this effort: ML-based methods are used for shower classification, for combining multiple calorimeter clusters into a single reconstructed object, and for the association of tracks with calorimeter clusters. In this presentation, the current use of ML in TICL will be outlined, recent results will be shown, and future directions will be discussed.

Auteurs: BEAUDETTE, Florian (Centre National de la Recherche Scientifique (FR)); SOKMEN, Gamze (LLR/CNRS); BIR-IUKOV, Kirill (LLR / École Polytechnique (FR)); GHOSH, Shamik; CUISSET, Theo (LLR / École Polytechnique (FR))

Orateur: SOKMEN, Gamze (LLR/CNRS)

Classification de Session: ML in Experimental Design and Control

Classification de thématique: Object detection and reconstruction