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Machine learning for muon identification at the CMS experiment

Muon objects are an important component of the CMS physics program, with several analyses focusing on final states involving muons. Efficient identification of prompt and non-prompt muons are essential for many physics studies. To enhance muon identification beyond the standard cut-based criteria used in Run 2, new identification strategies based on machine learning techniques have been developed. Specific multivariate algorithms have been optimized to select respectively signatures with prompt muons with medium transverse momentum (greater than 10 GeV), for rejecting misidentified muons in the same kinematic regime and finally for selecting "soft"muons such as muons from heavy-flavor hadrons decays against misidentified muons and muons from long-lived light-flavor hadron decays. This presentation will highlight the performance of the new classifiers, compared with the cut-based identification criteria in data and simulation.

AI keywords

Signal identification reconstruction, inference, ML classifiers

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