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Level-1 Track Quality Evaluation at CMS for the HL-LHC

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The upcoming High-Luminosity LHC will allow 200 proton-proton collisions per bunch crossing on average, thus creating highly complex events demanding efficient data reconstruction and processing. In order to meet these requirements, the Compact Muon Solenoid (CMS) experiment is upgrading its Level-1 trigger system. Among these updates will be the reconstruction of charged particle tracks in the silicon tracker, enabling more precise track selection further down the pipeline. In this work, we will present the development of a track quality variable which combines many of the reconstructed track properties into one feature that describes whether the track is real or fake, or whether the reconstruction represents a genuine particle or not. Using machine learning techniques, track quality can be evaluated and used to select tracks efficiently and quickly while barely using computational resources. This track quality variable has immense value to standard model searches requiring exact reconstruction such as missing energy analyses.

In-person participation

Yes

Primary author: SAVARD, Claire

Presenter: SAVARD, Claire

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