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Identification of tau lepton using Deep Learning techniques at CMS

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The reconstruction and identification of tau lepton in semi-leptonic (hereinafter referred to as hadronic decays) are crucial for all analyses with tau leptons in the final state. To discriminate the hadronic decays of tau from all 3 main backgrounds (quark or gluon jets, electrons, and muons), maintaining a low rate of misidentification (below 1%) and at the same time with high efficiency on the signal, the information of multiple CMS sub-detectors must be combined. Application of deep machine learning techniques allows exploiting the available information in a very efficient way. Introduction of a new multi-class DNN-based discriminator provides considerable improvement of the tau identification performance at CMS.

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