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First CMS direct search for H(cc) at CMS - charm tagging and machine learning

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The first CMS results for direct search of the H boson decaying into charm quarks are presented. The search is based on proton-proton collisions recorded by the CMS experiment at the CERN LHC in 2016, corresponding to an integrated luminosity of 35.9 fb−1 at sqrt(s) = 13 TeV. The analysis strategy targets events in which the Higgs boson is produced in association with a W or a Z boson, exploiting two different regimes of the Higgs boson transverse momentum through the identification of dedicated event topologies. The "resolved-jet" and "merged-jet jet"topologies are aiming to identify respectively those events where the Higgs boson decay products give rise to two distinct AK4 jets and those where both the boosted charm quarks are reconstructed in a single AK15 jet. The talk, after a brief overview on the search design, is focussing on the analysis technical details, particularly in the heavy flavour tagging algorithm implied to efficiently identify jets originated from the hadronization of charm quarks in such topologies, making use of advanced machine learning techniques.

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