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Search for the Higgs boson decaying to charm quarks using large-radius jets with the CMS experiment

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Studying the decay of the standard model Higgs boson to a pair of charm quarks is of vital importance as it directly probes the Yukawa coupling to second generation quarks. However, the hunt for H->cc is extremely challenging at the LHC due to large backgrounds. Recently, a search for H->cc has been performed by the CMS experiment, using advanced machine learning techniques and exploiting both the "resolved-jet" and "merged-jet" topologies. In this talk, we present the search in the merged-jet topology, which adopts a novel approach that reconstructs both quarks from the Higgs decay with a large-radius jet and exploits advanced deep learning techniques to identify H->cc decays. The use of these novel techniques significantly improves the sensitivity of the search.

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