Laboratoire LEPRINCE-RINGUET
Ecole polytechnique IN2P3/CNRS

# Séminaire

## How charming is the Higgs boson?

Since the discovery of the Higgs boson in 2012, the high energy physics community has been devoted to unveiling its nature by measuring its fundamental properties, in particular its couplings with the standard model particles. It has recently been possible to complete the measurements of the Higgs boson couplings to the third generation fermions, with the observation of ttH and Hbb in 2018. The next frontier is the measurement of the Higgs boson couplings to the second generation fermions. In this regard, the Higgs boson decay to charm quarks represents a unique opportunity to constrain the Yukawa couplings to the second generation of quarks. The first CMS direct search for Higgs boson decay to charm quarks is 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 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 by splitting into two dedicated event topologies. A focus is given to the crucial heavy flavour tagging algorithms applied to efficiently identify jets originated from the hadronisation of charm quarks by making use of advanced machine learning techniques.

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Responsables séminaires

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