

Abstract Submitted  
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**Search for a Higgs Boson Decaying to Two Charm Quarks with Resolved-Jet Topology using Run 2 CMS Data** BJORN BURKLE, Brown University, LUCA MASTROLORENZO, ANDREY POZDNYAKOV, SPANDAN MONDAL, ANDRZEJ NOVAK, ALENA DODONOVA, ALEXANDER SCHMIDT, RWTH Aachen University, XAVIER COUBEZ, ULRICH HEINTZ, MEENAKSHI NARAIN, Brown University, CMS COLLABORATION — With the observation of the  $H \rightarrow b\bar{b}$  decay process, the Higgs Yukawa coupling to massive 3rd generation particles have all been measured and our heads now turn towards the 2nd generation. A direct search for the decay of a Higgs boson to charm quarks was originally thought to be beyond the scope of the LHC due to low the  $H \rightarrow c\bar{c}$  branching fraction and the difficulty of correctly identifying jets originating from the hadronization of charm quarks. However, through the use of modern machine learning and advanced analysis techniques the potential reach of such a search continues to increase. In this talk I will present a study which looks for a Higgs bosons produced in conjunction with a vector boson (the so-called VH production mode) with the Higgs boson decaying to a pair of charm quarks. The analysis focuses on events where the charm quarks hadronize into two distinct jets, and is split into multiple channels based on the decay of the W and Z boson. Events were produced in  $\sqrt{s} = 13$  TeV proton-proton collisions and collected during the Run 2 data collection period of the CMS detector.

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