



Contribution ID: 67

Type: **not specified**

Search for $H \rightarrow cc$ and measurement of $H \rightarrow bb$ via $t\bar{t}H$ production

A search for the standard model Higgs boson decaying to a cc pair, produced in association with a $t\bar{t}$ pair ($t\bar{t}H$) is presented. The search is performed with the full Run 2 dataset, corresponding to an integrated luminosity of 138/fb. Advanced machine learning techniques are employed for jet flavor identification and event classification. The $H \rightarrow bb$ decay is measured simultaneously. The measurement provides the best individual limits on $H \rightarrow cc$ to date, and achieves a 4.4 std. dev. significance for the existence of $t\bar{t}H(H \rightarrow bb)$. The measurement relies heavily on the background estimation of $t\bar{t}$ +heavy flavor jets, and should be an interesting highlight for the TOP2025 conference.

Field

CMS

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