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## Four-top final states as a probe of Two-Higgs-Doublet models

*Thursday 29 September 2022 15:00 (15 minutes)*

Using a CMS measurement of four top ( $t\bar{t}t\bar{t}$ ) production in proton-proton collisions we constrain the parameter space of BSM scalar models. We study these effects for models with a generic scalar  $X$  with couplings to  $W$ -bosons and to top-quarks. We use Monte-Carlo simulators and fast detector simulations to recast the CMS analysis in order to obtain upper limits on the cross section times branching fraction for the production modes  $X \rightarrow (t\bar{t}, t\bar{t}, X) + X$  with  $X \rightarrow t\bar{t}$ , where  $X$  is a new heavy Higgs  $H$ , a pseudoscalar  $A$  or mixed CP-state. Furthermore we study the impact on Two-Higgs-Doublet models where four top production places constraints on the low  $\tan\beta$  region which is of special interest for Baryogenesis.

### Summary

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