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# Probing neutral Higgs Boson with all-top and same-sign top final states at LHC

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A general two Higgs doublet model is adopted to study flavor changing neutral Higgs (FCNH) interactions in $pp \to t\phi \to t(tc)$ at the Large Hadron Collider, where $\phi$ is either the CP-even Higgs scalar ($H$) or the CP-odd Higgs pseudoscalar ($A$). We considered two final states, (i) single lepton: $ttc \to bjjcb\ell\nu$, and (ii) same sign di-lepton: $ttc \to bbc\ell\ell\nu\nu$ where $\ell = e$ or $\mu$ and $\nu =$ neutrino, and $t$ represents either a top quark or an anti-top quark. We evaluated the cross sections for the FCNH signal and for the dominant physics backgrounds. Realistic acceptance cuts are applied to investigate the discovery potential. In addition, we have applied $b$ tagging and $c$ tagging at the event level using the ATLAS and CMS tagging and mis-tagging efficiencies. Promising results have been obtained for the single lepton top quark final states to reconstruct the Higgs mass. Furthermore, we employ the Higgs mass from the single lepton analysis to develop selection criteria for the same sign di-lepton final state, which is almost background free. Since the discovered light Higgs scalar behaves like the standard model Higgs boson, we expect $H \to tc$ and $A \to tc$ to offer great promise to search for new physics beyond the Standard Model.

## Mini Symposia (Invited Talks Only)

## Plenary (Invited talks only)

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