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# Top-Higgs Associated Production involving $m_{A^0}$, $m_{H^0} \sim 300$ GeV

*Thursday, July 11, 2019 3:00 PM (15 minutes)*

We revisit an old proposal where a pseudoscalar $A^0$ has mass between $t\bar{c}$ and $t\bar{t}$ thresholds, but possess extra Yukawa couplings by absence of $Z_2$ symmetry. With $\rho_{tt}$ small, it evades $gg \to A^0 \to h^0(125)Z$ constraints, where approximate alignment also helps. We find this scenario with relatively light $A^0$ is not yet ruled out, and $cg \to tA^0 \to tt\bar{c}$ can probe sizable $\rho_{tc}$ at the LHC. In a similar vein, we find that discovery is possible for $m_H \sim 300$ GeV for $cg \to tH^0 \to thh$, but would need finite $h$-$H$ mixing angle $\cos\gamma$ to allow for finite $\lambda_{Hhh}$ coupling, and $\rho_{tc}$ also needs to be not too small. The latter could drive electroweak baryogenesis, which further motivates the search.

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