

Probing Type-I 2HDM light Higgs in the top-pair-associated diphoton channel

We investigate the Type-I Two-Higgs-Doublet Model (2HDM-I) as a potential explanation for the 95 GeV diphoton excess observed at the LHC, and assess the feasibility of discovering a 95 GeV Higgs boson at future hadron colliders. Our analysis shows that the direct Higgs search data strongly constrain the Higgs-mixing angle parameter. Subsequent collider simulations focus on the $pp \rightarrow t(\rightarrow W^+b)\bar{t}(\rightarrow W^-\bar{b})h(\rightarrow \gamma\gamma)$ process and its relevant backgrounds on HL-LHC, HE-LHC and FCC-hh. For different colliders, statistical significances of 2σ and 5σ can be achieved at different integrated luminosity. At the HL-LHC, certain samples can achieve a significance of 5σ with an integrated luminosity of $L = 706 \text{ fb}^{-1}$.

Primary authors: 董, 亚博 (河南大学); Dr 王, 坤; Prof. 朱, 经亚

Presenter: 董, 亚博 (河南大学)