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Recasting searches for pp -> A(H) -> ZH(A) -> l+l- bb (and other processes) onto 2HDM parameter spaces

Friday 19 February 2021 13:00 (15 minutes)

To extract more information from new physics searches at the LHC, we examine an experimental analysis of A production followed by its ZH decay into $l^+l^-b\bar{b}$ ($l = e, \mu$). The original search, from the ATLAS Collaboration, was performed at Run 2 with 36.1 fb^{-1} of luminosity.
This talk presents the outcome of reinterpreting it as a $pp \to H \to ZA \to l^+l^-$ search, in the presence of the latest experimental and theoretical constraints, in the context of all standard 2-Higgs Double Model (2HDM) types, so as to test the true sensitivity of LHC to this Beyond Standard Model (BSM) scenario at present and in the future. This talk also discusses a second reinterpretation study making use of existing results from the CMS Collaboration, specifically, searches for light BSM Higgs pairs produced via $pp \to H_{\rm SM} \to hh(AA)$ into a variety of final states. Through this, we test the LHC sensitivity to other possible new signals to investigate in the future, like $pp \to H_{SM} \to ZA \to ZZh$, by taking advantage of strong correlations between these processes existing in, e.g., the 2HDM type-I.

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