Contribution ID: 71

Type: Poster

Investigating Resonant Higgs Signatures in the Context of a Two Higgs Doublet Model (2HDM)

In this study, we investigate Higgs-like resonant signals and recent anomalies found in searches for high-mass scalar resonances at the LHC. We propose a Two-Higgs-Doublet Model (2HDM) as a natural extension of the Standard Model to account for these phenomena, incorporating a scalar singlet for additional flexibility. The model's Higgs sector consists of two CP-odd bosons and one charged scalar boson, resulting in three CP-even scalar bosons, one CP-odd scalar, and one charged scalar. Our analysis focuses on determining the masses of these particles and comparing them with reported experimental anomalies. Among the key findings, we identify a light neutral scalar with a mass around 95 GeV and a charged Higgs close to 130 GeV. Furthermore, we explore scalar resonances decaying into photon pairs with masses of about 95 GeV and 152 GeV, as well as an excess in diboson events at 680 GeV observed by CMS. We consider two possible charge configurations for the scalar singlet, leading to distinct cubic or quartic couplings in the scalar sector. Through an exploration of the scalar potential and parameter space, we align the predicted masses with the observed anomalies. We find that the 95 GeV scalar fits well with the lightest CP-even Higgs, while the charged Higgs at 130 GeV also falls within our model's predictions. Our results show strong agreement between these experimental excesses and regions of high solution density in our theoretical framework.

Author: Prof. GIRALDO USUGA, Yithsbey (Universidad de Nariño)

Co-authors: Prof. ROJAS, Eduardo (Universidad de Nariño.); Mr RODRÍGUEZ, Oscar (Universidad de Antioquia); Dr BENAVIDES, Richard (Instituto Tecnológico Metropolitano, ITM); ANTONIO PONCE GUTIERREZ, WILLIAM

Presenter: Prof. GIRALDO USUGA, Yithsbey (Universidad de Nariño)