



Contribution ID: 743

Type: **Parallel Talk**

Mounting evidence for a 95 GeV Higgs boson

Friday, 8 July 2022 10:00 (15 minutes)

In 2018 CMS reported an excess in the light Higgs-boson search in the diphoton decay mode at about 95 GeV based on Run 1 and first year Run 2 data. The combined local significance of the excess was 2.8σ . The excess is compatible with the limits obtained in the ATLAS searches from the diphoton search channel. Recently, CMS reported another local excess with a significance of 3.1σ in the light Higgs-boson search in the di-tau final state, which is compatible with the interpretation of a Higgs boson with a mass of about 95 GeV. We show that the observed results can be interpreted as manifestations of a Higgs boson in the Two-Higgs Doublet Model with an additional real singlet (N2HDM). We find that the lightest Higgs boson of the N2HDM can fit both excesses simultaneously, while the second-lightest state is such that it satisfies the Higgs-boson measurements at 125 GeV, and the full Higgs-boson sector is compatible with all Higgs exclusion bounds from the searches at LEP, the Tevatron and the LHC as well as with other theoretical and experimental constraints. Finally, we demonstrate that it is furthermore possible to accommodate the excesses observed by CMS in the two search channels together with a local 2.3σ excess in the $b\bar{b}$ final state observed at LEP in the same mass range

In-person participation

Yes

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Session Classification: Higgs Physics

Track Classification: Higgs Physics