

XVth Quark Confinement and the Hadron Spectrum



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Searching for a new (pseudo)scalar at 95 GeV

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The CMS group has recently reported an anomaly in the production of particles at ~ 95 GeV above expected background at the LHC in the ditau and diphoton channels. Taken with an older result from LEP showing a similar anomaly in bb production, this indicates the prospect of a new particle at this energy.

As a possible explanation for these anomalies, we consider a pair of Simplified Models that add an additional Higgs doublet to the Standard Model –realizing the well-known Two-Higgs Doublet Model (2HDM) –as well as an additional scalar or pseudoscalar gauge singlet. We investigate the possibility that the lightest scalar or pseudoscalar state in these models could have a mass of 95 GeV, generating the observed excesses. We also apply relevant bounds from flavour physics (primarily from decays of rare B-mesons), collider physics (resonance and missing transverse energy searches), and Higgs physics to determine if these constraints can be satisfied while still generating the observed excesses.

We find that both models could generate the anomalies seen at the LHC, but neither can effectively reproduce the bb anomaly at the LEP.

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