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## Growing evidence of new scalar at the large hadron collider with a mass around 152 GeV

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After the discovery of a Higgs boson at the Large Hadron Collider (LHC) by the ATLAS and CMS experiments, a number of multi-lepton anomalies that represent a significant experimental evidence for a new physics have been identified. These anomalies are consistent with the decay of a heavy boson  $H$  with a mass around 270 GeV, into a Higgs like boson  $S$  of a mass around 150 GeV. The latter can be inferred from the invariant mass of final states with opposite sign leptons in these multi-lepton excesses. Motivated by this indirect evidence of a beyond the standard model of particle physics (BSM) scalar, we performed a combined fit of several direct searches for a Higgs-like by ATLAS and CMS, within the mass region of the  $S$  scalar. The results of this combination are compared with predictions for a resonant pair production of the  $S$  in a simplified model. A local significance of  $5.2 \sigma$  is achieved for a mass of  $m_S = 152$  GeV. This therefore indicates a more stringent evidences for a new scalar at 152 GeV, in multiple decay channels, such as,  $Z\gamma, \gamma\gamma, WW, e\mu$  final states.

**Apply to be considered for a student ; award (Yes / No)?**

no

**Level for award;(Hons, MSc, PhD, N/A)?**

N/A

**Primary authors:** DAHBI, Salah-eddine (University of Wits); Prof. MELLADO, Bruce (University of the Witwatersrand and iThemba LABS, National Research Foundation)

**Presenter:** DAHBI, Salah-eddine (University of Wits)

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