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Vector-like fermion dark matter in light of di-photon excess at LHC

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Recent data from CMS and ATLAS experiments at CERN LHC suggest a diphoton excess of invariant mass around 750 GeV. Apparently the width of the resonance is around 45 GeV. To explain this anomaly we introduce a singlet scalar and a dark sector comprising of a vector-like lepton doublet and a singlet which are odd under a Z_2 symmetry. As a result the dark matter emerges as an admixture of the neutral component of the doublet and the singlet leptons. The charge partner of the vector-like doublet lepton assists the additional scalar to decay to diphotons of invariant mass 750 GeV and thus explaining the excess observed at LHC. We show the relevant parameter space for correct relic density and direct detection of dark matter.

Summary

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