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Title:	Interpreting 750 GeV diphoton excess in SU(5) grand unified theory
Authors:	Patel, K.M. (/jspui/browse?type=author&value=Patel%2C+K.M.) Sharma, Pankaj (/jspui/browse?type=author&value=Sharma%2C+Pankaj)
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Abstract:	The ATLAS and CMS experiments at the LHC have found significant excess in the diphoton invariant mass distribution near 750 GeV. We interpret this excess in a predictive nonsupersymmetric SU(5) grand unified framework with a singlet scalar and light adjoint fermions. The 750 GeV resonance is identified as a gauge singlet scalar. Both its production and decays are induced by 24 dimensional adjoint fermions predicted within SU(5). The adjoint fermions are assumed to be odd under Z2 symmetry which forbids their direct coupling to the standard model fermions. We show that the observed diphoton excess can be explained with sub-TeV adjoint fermions and with perturbative Yukawa coupling. A narrow width scenario is more preferred while a simultaneous explanation of observed cross section and large total decay width requires some of the adjoint fermions lighter than 375 GeV. The model also provides a singlet fermion as a candidate of cold dark matter. The gauge coupling unification is achieved in the framework by introducing color sextet scalars while being consistent with the proton decay constraint.
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