

2002 Model Containing the Diphoton Resonance

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The 750 GeV diphoton excess may be identified with the scalar (or pseudoscalar) field S_3 which replaces the μ parameter of supersymmetry. In a specific anomaly-free $U(1)$ extension of the supersymmetric standard model (E. Ma, PRL 89, 041801 (2002)), the following interactions are mandatory: S_3UU^c , S_3DD^c , $S_3\phi_1\phi_2$, $S_1S_2S_3$, where U, U^c, D, D^c may be leptoquarks (E. Ma, PRD 81, 097701 (2010)). Hence S_3 is produced by gluon fusion from the leptoquarks, and decays to two photons from them as well as the charged components of $\phi_{1,2}$. Its width may be increased from $S_3 \rightarrow S_1S_2$ decay as well.

Since S_3 replaces the μ parameter, the 750 GeV diphoton resonance (if confirmed and supported by subsequent data) may be considered in retrospect as the first evidence for supersymmetry.