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Sum-rule constraints on possible (750 GeV?) diphoton resonances at the LHC

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By means of forward sum-rules for $\gamma\gamma$ and gg scattering we show that a spin-0 resonance with mass of the order of the TeV and a sizable $\gamma\gamma$ or gg partial width -of the order of a few GeV- must be accompanied by higher spin resonances with $J_{\mathbb{R}} \geq 2$ with similar properties, as expected in strongly coupled extensions of the Standard Model or, alternatively, in higher dimensional deconstructed duals. Furthermore, independently of whether the 750 GeV diphoton candidate is a scalar or a tensor, the large contribution to the forward sum-rules in the referred scenario implies the presence of states in the spectrum with $J_{\mathbb{R}} \geq 2$, being these high spin particles a manifestation of new extra-dimensions or composite states of a new strong sector.

Summary

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