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Measuring the diphoton coupling of a 750 GeV resonance at the LHC (12' + 3')

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A slight excess has been observed in the first data of photon-photon events at the 13 TeV LHC, that might be interpreted has a hint of physics beyond the Standard Model.
We show that a completely model-independent measurement of the photon-photon coupling of a putative 750 GeV resonance will be possible using the forward proton detectors scheduled at ATLAS and CMS.

We consider the possibility that the diphoton excess at 750 GeV is caused by a new scalar resonance produced in photon fusion.
This scenario is parametrised by only one relevant effective couplings and is thus minimal. We show that this setup can reproduce both the production rate and width of the resonance, and is not in conflict with the 8 TeV limits on the diphoton cross section.
The scenario also predicts event rates for WW, ZZ, $Z\gamma$ final states. We suggest to perform precision measurements by studying light-by-light scattering with intact protons detected in forward detectors.
We construct a simple model that shows that the required couplings can be achieved with new vectorlike, uncolored fermions (with a strong Yukawa coupling to the resonance) which may also account for the required width.

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