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Constraints on anomalous quartic gauge couplings at the LHC

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Most hard scattering processes at the LHC lead to breakup of the proton because of the single-parton exchange of the proton. However, since the proton is an electrically charged object, quasireal photon-exchange interactions can also take place. Since photons are color-singlet, sometimes the protons remain intact after the interaction, and these can be detected with forward proton detectors close to the beamline. These interactions open the possibility of studying electromagnetic interactions in energies never explored before. In this presentation, the discovery potential of anomalous quartic gauge couplings in photon-induced reactions at the LHC will be discussed. Special attention is given to constraints on quartic four-photon couplings induced by axion-like particles coupled to the electromagnetic field, which can be probed in the scattering of light-by-light at the LHC, and more generally on studies of yyyy, yyyZ, yyWW, and yyZZ anomalous quartic couplings.

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