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Probing anomalous triple gauge boson couplings via photon-photon scattering at the LHC

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Abstract

In this paper, we study the anomalous triple gauge boson couplings (aTGCs) via proton-proton collisions at the high luminosity phase of LHC through the process of central exclusive production $pp \rightarrow pWW\gamma p$ at the center of the mass energy 14 TeV and the integrated luminosity 3 ab^{-1} . In this study, to reduce the background processes, the leptonic decay of bosons is considered. In order to distinguish this process from inclusive processes in proton-proton collision, final intact protons must be detected. For this purpose, we use the feature of the forward detectors embedded at a distance of about two hundred meters on both sides of the proton interaction point and a few millimeters transverse distance from the proton beam. Using the kinematics of the particles produced in the central detector and their dependence on the kinematics of the intact protons in the very forward region, we set the appropriate cuts, obtaining the expected limits on TGCs. Comparing the obtained results with the existing experimental limits indicates that this process can be considered as a complementary process to the study these couplings and improve the existing limits on the TGCs.

Keywords: central exclusive production, forward detector, anomalous triple gauge coupling

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