Published for SISSA by Springer

Received: *August 11, 2021*
Accepted: *September 27, 2021*
Published: *October 15, 2021*

Probing anomalous $\gamma\gamma\gamma Z$ couplings through γZ production in $\gamma\gamma$ collisions at the CLIC

S.C. İnan[a] **and A.V. Kisselev**[b]

[a] *Department of Physics, Sivas Cumhuriyet University, Sivas 58140, Turkey*
[b] *Division of Theoretical Physics, A.A. Logunov Institute for High Energy Physics, NRC "Kurchatov Institute", Protvino 142281, Russia*

E-mail: sceminan@cumhuriyet.tr, alexandre.kisselev@ihep.ru

Abstract: We have estimated the sensitivity to the anomalous couplings of the $\gamma\gamma\gamma Z$ vertex in the $\gamma\gamma \to \gamma Z$ scattering of the Compton backscattered photons at the CLIC. Both polarized and unpolarized collisions at the e^+e^- energies 1500 GeV and 3000 GeV are addressed, and anomalous contributions to helicity amplitudes are derived. The differential and total cross sections are calculated. We have obtained 95% C.L. exclusion limits on the anomalous quartic gauge couplings (QGCs). They are compared with corresponding bounds derived for the $\gamma\gamma\gamma Z$ couplings via γZ production at the LHC. The constraints on the anomalous QGCs are one to two orders of magnitude more stringent that at the HL-LHC. The partial-wave unitarity constraints on the anomalous couplings are examined. It is shown that the unitarity is not violated in the region of the anomalous QGCs studied in the paper.

Keywords: Phenomenological Models

ArXiv ePrint: 2108.04478

https://doi.org/10.1007/JHEP10(2021)121

JHEP10(2021)121