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## Probing Neutral Triple Gauge Couplings via $Z\gamma(\ell^+\ell^-\gamma)$ Production at $e^+e^-$ Colliders

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Neutral triple gauge couplings (nTGCs) are absent in the Standard Model (SM) and at the dimension-6 level in the Standard Model Effective Field Theory (SMEFT), arising first from dimension-8 operators. As such, they provide a unique window for probing new physics beyond the SM. These dimension-8 operators can be mapped to nTGC form factors whose structure is consistent with the spontaneously-broken electroweak gauge symmetry of the SM. In this work, we study the probes of nTGCs in the reaction  $e^+e^- \rightarrow Z\gamma$  with  $Z \rightarrow \ell^+\ell^-$  ( $\ell=e,\mu$ ) at an  $e^+e^-$  collider. We perform a detector-level simulation and analysis of this reaction at the Circular Electron Positron Collider (CEPC) with collision energy  $\sqrt{s} = 240$  GeV and an integrated luminosity of  $20 \text{ ab}^{-1}$ . We present the sensitivity limits on probing the new physics scales of dimension-8 nTGC operators via measurements of the corresponding nTGC form factors.

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