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## Precision studies of quantum electrodynamics at future e<sup>+</sup>e<sup>-</sup> colliders

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We classify the possible deviations from the Standard Model in the QED-dominated  $e^+e^- \rightarrow \gamma\gamma$  process under the assumption of a preserved  $SU(2)_L \times U(1)_Y$  symmetry. We find that the only deviations really observable in practice correspond to a correction of the differential cross section by a factor  $(1 + \frac{c_8 s^2}{8\pi\alpha\Lambda^4} \sin^2 \theta)$ , where  $\Lambda$  is the scale of new physics,  $\theta$  is the polar angle of any of the final state photons and  $c_8$  is a constant of order 1.

We also provide sensitivity estimates for QED deviations at future  $e^+e^-$  facilities. An  $e^+e^-$  collider operating at  $\sqrt{s} = 3$  TeV could provide sensitivity to  $\Lambda$  scales as large as 15 TeV, provided that acceptances and efficiencies are controlled at the per mille level. Finally, we also discuss the possibility of a measurement of the luminosity at the FCC-ee with

*lessim*  $10^{-4}$  precision, using analyses of the  $e^+e^- \rightarrow \gamma\gamma$  process at  $\sqrt{s} \approx m_Z$  energies.

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