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The full electroweak $\mathcal{O}(\alpha)$ corrections to $\gamma\gamma \rightarrow \ell^- \ell^+$

We present high-precision predictions for $\ell^- \ell^+$ production ($\ell = \mu, \tau$) at $\gamma\gamma$ collisions by considering a complete set of one-loop-level scattering amplitudes, i.e., full electroweak (EW) $\mathcal{O}(\alpha)$ corrections together with soft and hard QED radiation. We perform detailed numerical discussion of the one-loop EW radiative corrections, particularly the pure QED and Weak corrections, and then discuss the production rates in terms of different polarization modes of initial photons. We observe an improvement up to two-times for the case of oppositely polarized photons. It is found that the considered corrections enhance the Born cross section within ten percent of total relative correction for both production channels. Our results indicate that the full EW corrections must be included to improve a percent level accuracy.

Collaboration / Activity

High-precision predictions

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