

To probe the nonlinear effects of photon-photon interaction in quantum electrodynamics, we study the generation of circular polarized photons by the collision of two linearly polarized laser beams. In the framework of the Euler-Heisenberg effective Lagrangian and the quantum Boltzmann equation for the time evolution of the density matrix of polarization, we calculate the intensity of circular polarization generated by the collision of two linearly polarized laser beams and estimate the rate of generation that is proportional to  $\omega^2$ . As a result, we show that the generated circular polarization can be experimentally measured by two head-on colliding optical laser beams of a cross-sectional area  $\sim 0.01 \text{ cm}^2$  and a laser pulse energy of  $\sim \text{mJ}$ , which are currently available in laboratories. Our study presents a valuable supplement to other theoretical and experimental frameworks for the study and measurement of the nonlinear effects of photon-photon interaction in quantum electrodynamics.

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