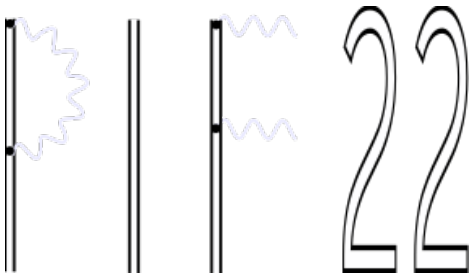

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Pair production in colliding laser pulses: Computational Aspects

Tuesday 30 August 2022 14:35 (25 minutes)

We discuss spatially- and temporally-resolved, non-perturbative pair production in colliding, linearly polarized laser pulses on the basis of two numerical approaches; a generalized WKB approach culminating in solving a modified Riccati equation and large-scale simulations based on the Dirac-Heisenberg-Wigner formalism.

We discuss how Dirac-Heisenberg-Wigner (quantum kinetic theory) as well as the numerical WKB formalism allow us to numerically observe the transition from the Sauter-Schwinger regime at arbitrarily small laser frequencies to the Breit-Wheeler regime at large photon energies and highlight the qualitative agreements of both approaches.

In particular, we demonstrate that our new, advanced scheme vastly improves the predictions given by the Locally-Constant-Field-Approximation (LCFA) in the context of the overall pair production yield. In particular, in the regime of light-light interactions of more than 25 keV energy.

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