

Computations Within the Sauter-Schwinger Effect for Colliding Laser Pulses

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We discuss the computational aspects of our work [1] on electron-positron pair production for two identical, colliding laser pulses (transversal and linearly polarized), cf. talk by R. Schützhold.

In this context, we numerically solve the particle production rate within the Heisenberg-Wigner formalism (quantum kinetic formalism) [2]. Due to the fact that the equal-time Heisenberg-Wigner approach is formally given in terms of rather involved partial integrodifferential equations, special emphasis is put on presenting numerical solution techniques applicable to Wigner function approaches in general. Furthermore, we display additional computational tools often required in order to obtain noise-free particle momentum spectra [3].

Finally, we give an outlook on the applicability of our newly developed techniques within the Heisenberg-Wigner formalism with respect to more realistic field configurations.

References

- [1] C Kohlfürst, N Ahmadiniaz, J Oertel and R Schützhold, in preparation
- [2] D Vasak, M Gyulassy and H T Elze, *Ann. Phys. (N.Y.)* **173**, 462 (1987)
- [3] C Kohlfürst, *Phys. Rev. D* **101**, 096003 (2020)