



Sommerfeld Theory Colloquium

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Identifying the Time Scales in Electron-Positron Production
from Ultra-Strong Electric Fields

Electron-positron pair production in ultra-strong electric fields, the Sauter-Schwinger effect, is a long-standing theoretical prediction. In this talk the Sauter-Schwinger effect will be introduced and the related field-strength and energy scales as well as the possibility to verify this effect in upcoming multi-petawatt laser facilities will be discussed.

The Dirac-Heisenberg-Wigner formalism provides a fully Poincar-covariant, non-perturbative phase space description of the Sauter-Schwinger effect, and therefore its key quantities will be introduced. Some respective numerical results will be shown and discussed.

An interpretation of a particle distribution at finite (non-asymptotic) times will be provided via a Gedankenexperiment. This in turn enables one to isolate and, therefore, identify the relevant time scales of particle formation. The resulting generic aspects for particle creation in quantum physics beyond perturbation theory will be elucidated.

Wednesday, 8 November 2023, 16:15h, Room A348, Theresienstr. 37/III