

Electric Permittivity of the Vacuum in a Constant Electric Field

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I discuss the electric permittivity of the vacuum in the presence of a strong constant electric field. I point out that a characteristic oscillating pattern appears for probes with large frequencies, where the slow-frequency approaches such as the Euler-Heisenberg Lagrangian and semi-classical methods are invalid, due to the change of the Dirac-sea structure. I also clarify the relationship between the number of electron-positron pairs produced by the dynamically assisted Schwinger effect and the electric permittivity.