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Kinetic equation approach to pair creation in strong fields

Experimental validation of the Schwinger effect i.e. particle production from QED vacuum, remains elusive. State-of-the-art facilities are yet to generate the required electric field, which is constrained by the electron mass. However, graphene, a 2D condensed matter system with hexagonal lattice structure, behaves like massless Dirac fields near Dirac points. The advantage of this masslessness is the reduced electric field needed to observe Schwinger type particle-hole production. In this presentation I will present a kinetic equation approach to describe such phenomena. The model is capable of producing experimentally observed particle hole creation rate as well as describing the momentum profile of produced particles for various incident electric field pulses.

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