Contribution ID: **56** Type: **not specified**

Real time dynamics, confinement and phase transitions in Z_n Schwinger-Weyl lattice models for 1+1 QED

Wednesday, 11 December 2019 12:15 (15 minutes)

We study the out-of-equilibrium properties of (1+1)-dimensional quantum electrodynamics (QED), discretized via the staggered-fermion Schwinger model with an Abelian Z_n gauge group. We look at two relevant phenomena: first, we analyze the stability of the Dirac vacuum with respect to particle/antiparticle pair production, both spontaneous and induced by an external electric field; then, we examine the string breaking mechanism. We observe a strong effect of confinement, which acts by suppressing both spontaneous pair production and string breaking into quark/antiquark pairs, indicating that the system dynamics deviates from the expected behavior toward thermalization. We finally comment on the ground state properties of the considered models and on the evidence of phase transitions.

References:
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Session Classification: Session 2