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Title: Spontaneous breaking of Lorentz symmetry in QED3

Abstract: The phase diagram of quantum electrodynamics in three space-time dimensions as a function of fermion flavor number N exhibits two well-known phases: at large $N > N_{c1}$ the system is in a conformal gapless state, while for small $N < N_{c2}$ the fermions are expected to develop a dynamical mass due to spontaneous chiral symmetry breaking. Using epsilon expansion near the lower critical dimension of two, in combination with the recent results on the generalization of the F theorem to continuous dimension, we show that $N_{c1} > N_{c2}$. There is therefore an intermediate range of values of N at which a third phase is stabilized. We demonstrate that this phase is characterized by spontaneous breaking of Lorentz symmetry, in which a composite vector boson field acquires a vacuum expectation value with the fermions and the photon remaining massless.

References: L. Janssen, arXiv:1604.06354 [hep-th]; J. Braun, H. Gies, L. Janssen, D. Roscher, Phys. Rev. D **90** 036002 (2014).