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Absence of bilinear condensate in three-dimensional QED

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There are plausibility arguments that QED in three dimensions has a critical number of flavors of massless two-component fermions, below which scale invariance is broken by the presence of bilinear condensate. We present numerical evidences from our dynamical lattice simulations using overlap as well as Wilson-Dirac fermions for the absence of bilinear condensate using the following methods: finite-size scaling analysis of the low-lying eigenvalues of the Dirac operator, comparison of the eigenvalue distributions to the non-chiral random matrix theory, and by checking if the inverse participation ratio and number variance show ergodic behavior.

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