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Yang-Lee zeros, semicircle theorem and nonunitary criticality in open quantum dynamics

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The Yang-Lee edge singularity is a quintessential nonunitary critical phenomenon characterized by anomalous scaling. However, an imaginary magnetic field involved in this phenomenon makes its physical implementation highly nontrivial. We invoke the quantum-classical correspondence and quantum measurement to physically realize the nonunitary quantum criticality in an open quantum system [1].

In particular, we show that the essential singularity in the superconducting gap is directly related to the number of Yang-Lee zeros which are distributed on a semicircle in the complex plane of the interaction strength due to the Fermi-surface instability. We also present photonic experiments to directly measure the partition function and the Yang-Lee zeros, where unconventional scaling laws for finite-temperature quantum dynamics are observed and agree with our theory predictions [3].

[1] N. Matsumoto, M. Nakagawa, and M. Ueda, Phys. Rev. Res. 4, 033250 (2022).

[2] H. Li, X.-H. Yu, M. Nakawaga, and M. Ueda, Phys. Rev. Lett. 131, 216001 (2023).

[3] H. Gao, K. Wang, L. Xiao, M. Nakagawa, N. Matsumoto, D. Qu, H. Lin, M. Ueda, and P. Xue, arXiv:2312.01706.

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