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Stabilization of quantum states at ESQPTs

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It is well known that ESQPTs can either enhance or suppress survival probability of the initial state after a quantum quench. These effects, theoretically demonstrated particularly in the Lipkin model, the Tavis-Cummings model and the Rabi model, see e.g. Refs. [1,2], represent a possible experimental test of criticality in the excited domain. We will show the common origin of both these phenomena and provide their semiclassical explanation in terms of Wigner quasiprobability distributions.

References:

[1] M. Kloc, D. Šimsa, F. Hanák, P.R. Kaprálová-Žďánská, P. Stránský, P. Cejnar, Phys. Rev. A 103, 032213 (2021).
[2] P. Stránský, P. Cejnar, R. Filip, Phys. Rev. A 104, 053722 (2021).

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