

PAPER

Quantum correlations in $\mathcal{PT}$ -symmetric systems

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Published 22 January 2021 • © 2021 IOP Publishing Ltd

Quantum Science and Technology, Volume 6, Number 2

Citation Federico Roccati *et al* 2021 *Quantum Sci. Technol.* **6** 025005

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Received 24 September 2020

Revised 12 November 2020

Accepted 2 December 2020

Published 22 January 2021



Method: Single-anonymous

Revisions: 1

Screened for originality? Yes

<https://doi.org/10.1088/2058-9565/abcfcc>

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Abstract

We study the dynamics of correlations in a paradigmatic setup to observe $\mathcal{PT}$ -symmetric physics: a pair of coupled oscillators, one subject to a gain one to a loss. Starting from a coherent state, quantum correlations (QCs) are created, despite the system being driven only incoherently, and can survive indefinitely. Both total and QCs exhibit different scalings of their long-time behavior in the $\mathcal{PT}$ -broken/unbroken phase and at the exceptional point (EP). In particular, $\mathcal{PT}$ symmetry breaking is accompanied by non-zero stationary QCs. This is analytically shown and quantitatively explained in terms of entropy balance. The EP in particular stands out as the most classical configuration, as classical correlations diverge while QCs vanish.

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