PAPER

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

Federico Roccati[5,1], Salvatore Lorenzo[1], G Massimo Palma[1,2], Gabriel T Landi[3], Matteo Brunelli[4] and Francesco Ciccarello[1,2]

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federico.roccati@unipa.it

[1] Università degli Studi di Palermo, Dipartimento di Fisica e Chimica—Emilio Segrè, via Archirafi 36, I-90123 Palermo, Italy

[2] NEST, Istituto Nanoscienze-CNR, Piazza S. Silvestro 12, 56127 Pisa, Italy

[3] Instituto de Fısica, Universidade de Sao Paulo, CEP 05314-970, Sao Paulo, Sao Paulo, Brazil

[4] Cavendish Laboratory, University of Cambridge, Cambridge CB3 0HE, United Kingdom

[5] Author to whom any correspondence should be addressed.

Federico Roccati https://orcid.org/0000-0002-6981-0613

Salvatore Lorenzo https://orcid.org/0000-0002-0827-5549

G Massimo Palma https://orcid.org/0000-0001-7009-4573

Gabriel T Landi https://orcid.org/0000-0001-8451-9712

Matteo Brunelli https://orcid.org/0000-0002-5023-3780

Francesco Ciccarello https://orcid.org/0000-0002-6061-1255

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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.