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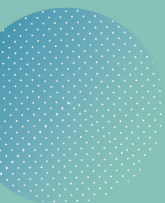
Wehrl entropy of entangled Segal-Bargmann oscillators

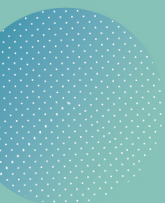by D. Alonso L ópez, J. A. R. Cembranos, D. Díaz-Guerra and A. Mínguez Sánchez

March 2023

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M A D R I D

Abstract

In this manuscript we study the Wehrl entropy of entangled oscillators. This semiclassical entropy associated with the phase-space description of quantum mechanics can be used for formulating uncertainty relations and for a quantification of entanglement. We focus on a system of two coupled oscillators described within its Segal-Bargmann space. This Hilbert space of holomorphic functions integrable with respect to a given Gaussian-like measure is particularly convenient to deal with harmonic oscillators. Indeed, the Stone-von Neumann theorem allows us to work in this space in a full correspondence with the ladder operators formalism. In addition, the Husimi pseudoprobability distribution is directly computed within the Segal-Bargmann formalism. Once we obtain the Husimi function, we analyze the Wehrl entropy and mutual information.

Keywords: Wehrl entropy, Segal-Bargmann,
 Entanglement, Husimi distribution, Mutual information.