Review of: "Fidelity of quantum blobs"

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Potential competing interests: No potential competing interests to declare.

The paper approaches an issue large interest in modern physics with respect to the notion of distinguishability between the states of a system. The fidelity function for quantum states is frequently used in quantum information science to estimate and distinguish between quantum states, thus optimizing performance.

The paper uses symplectic topology to investigate quantum fidelity in complex phase space for pairs of*quantum blobs*, defined as phase-space analogues of the squeezed coherent states (CS). The concept of distinguishability between system states is explained for classical mechanics, statistical mechanics and QM. The mathematical representation is built on the notion of symplectic capacity for a quantum blob.

The indeterminacy relation on the phase space says that the symplectic capacity of an arbitrary state cannot distort during its Hamiltonian flow so that its value is lesser than the Gromov width, as stated by the Gromov's non-squeezing theorem. The Schrödinger equation for the overlap results as a direct consequence of the conservation of quantum fidelity. Thus, the Schrödinger equation results as a representation of the quantum generalization of the Liouville theorem in classical mechanics. What is more, the Schrödinger equation predicts exactly the value of the overlap at a given moment of time, provided that the initial condition on the overlap is known.

I expect the approach to be applicable in domains such as quantum information processing and quantum metrology.

Originality → The paper is interesting, as well as the methodology and data analysis

Importance and clarity of research hypothesis → The research hypothesis is of real interest for modern physics

Consistency of the manuscript → The manuscript is self-consistent, logically organized and straightforward to follow

The title, abstract & conclusions are well chosen and descriptive