Averaged indicator of classicality/quantumness in quasiprobability representations of finite-dimensional quantum systems

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Abstract. We discuss measures of classicality/quantumness of states of finite-dimensional quantum systems, which are based on a deviation of quasiprobability distributions from true statistical distributions. Particularly, the dependence of the global indicator of classicality on the assigned geometry of a quantum state space is analysed for a whole family of Wigner quasiprobability representations. General considerations are exemplified by constructing the global indicator of classicality/quantumness for the Hilbert-Schmidt, Bures, Bogoliubov-Kubo-Mori and Wigner-Yanase-Dyson ensembles of qubits and qutrits. In the case of qutrits, by averaging over the one-parameter moduli space (describing a family of unitary non-equivalent Wigner distributions), we construct a mean indicator of classicality/quantumness which gives a representation independent characteristic of classicality.

References

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