

Behaviour of Non-local Correlations and Quantum Information Theoretic Measures in Frustrated Molecular Wheels

Authors : Amit Tribedi

Abstract : Genuine Quantumness present in Quantum Systems is the resource for implementing Quantum Information and Computation Protocols which can outperform the classical counterparts. These Quantumness measures encompass non-local ones known as quantum entanglement (QE) and quantum information theoretic (QIT) ones, e.g. Quantum Discord (QD). In this paper, some well-known measures of QE and QD in some wheel-like frustrated molecular magnetic systems have been studied. One of the systems has already been synthesized using coordination chemistry, and the other is hypothetical, where the dominant interaction is the spin-spin exchange interaction. Exact analytical methods and exact numerical diagonalization methods have been used. Some counter-intuitive non-trivial features, like non-monotonicity of quantum correlations with temperature, persistence of multipartite entanglement over bipartite ones etc. indicated by the behaviour of the correlations and the QIT measures have been found. The measures, being operational ones, can be used to realize the resource of Quantumness in experiments.

Keywords : 0D Magnets, discord, entanglement, frustration

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