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Title:	Simulating the effect of weak measurements by a phase damping channel and determining different measures of bipartite correlations in nuclear magnetic resonance
Authors:	Gautam, Akanksha (/jspui/browse?type=author&value=Gautam%2C+Akanksha) Singh, Amandeep (/jspui/browse?type=author&value=Singh%2C+Amandeep) Dorai, K. (/jspui/browse?type=author&value=Dorai%2C+K.) Arvind (/jspui/browse?type=author&value=Arvind)
Keywords:	NMR quantum information processing Phase damping channel Super quantum discord Weak positive operator-valued measure (POVM)
Issue Date:	2020
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Citation:	Physics Letters, Section A: General, Atomic and Solid State Physics, 384 (30)
Abstract:	Quantum discord is a measure based on local projective measurements which captures quantum correlations that may not be fully captured by entanglement. A change in the measurement process, achieved by replacing rank-one projectors with a weak positive operator-valued measure (POVM), allows one to define weak variants of quantum discord. In this work, we experimentally simulate the effect of a weak POVM on a nuclear magnetic resonance quantum information processor. The two-qubit system under investigation is part of a three-qubit system, where one of the qubits is used as an ancillary to implement the phase damping channel. The strength of the weak POVM is controlled by varying the strength of the phase damping channel. We experimentally observed two weak variants of quantum discord namely, super quantum discord and weak quantum discord, in two-qubit Werner and Bell-diagonal states. The resultant dynamics of the states is investigated as a function of the measurement strength
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