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Title:	Experimental demonstration of the violation of the temporal Peres-Mermin inequality using contextual temporal correlations and noninvasive measurements
Authors:	Singh, Dileep (/jspui/browse?type=author&value=Singh%2C+Dileep) Arvind (/jspui/browse?type=author&value=Arvind) Dorai, Kavita (/jspui/browse?type=author&value=Dorai%2C+Kavita)
Keywords:	Experimental demonstration temporal Peres-Mermin contextual temporal noninvasive measurements
Issue Date:	2022
Publisher:	American Physical Society
Citation:	Physical Review A, 105(2), 22216.
Abstract:	We present a generalized quantum scattering circuit which can be used to perform a noninvasive quantum measurement and implement it on NMR qubits. Such a measurement is a key requirement for testing temporal noncontextual inequalities. We use this circuit to experimentally demonstrate the violation of the Peres-Mermin inequality on a three-qubit NMR quantum information processor. Further, we experimentally construct a Bell-type inequality corresponding to the temporal Klyachko-Can-Binicioglu-Shumovsky (KCBS) inequality, and demonstrate that the maximum quantum correlation is achieved for four two-point correlation functions involved in this inequality. The experimental violation of all the inequalities matches well with the theoretically predicted values, within experimental errors.
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