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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 Peres-Mermin correlations noninvasive
Issue Date:	2022
Publisher:	arXiv
Citation:	EPL, 140(6), 68001
Abstract:	We present a generalized quantum scattering circuit which can be used to perform non-invasive quantum measurements, and implement it on NMR qubits. Such a measurement is a key requirement for testing temporal non-contextual inequalities. We use this circuit to experimentally demonstrate the violation of the Peres-Mermin inequality (which is the temporal analog of a Klyachko-Can-Binicioglu-Shumovsky (KCBS) inequality), on a three-qubit NMR quantum information processor. Further, we experimentally demonstrate the violation of a transformed Bell-type inequality (the spatial equivalent of the temporal KCBS inequality) and show that its Tsirelson bound is the same as that for the temporal KCBS inequality. In the temporal KCBS scenario, the contextual bound is strictly lower than the quantum temporal and nonlocal bounds.
Description:	Only IISER Mohali authors are available in the record.
URI:	https://doi.org/10.48550/arXiv.2101.02152 (https://doi.org/10.48550/arXiv.2101.02152) http://hdl.handle.net/123456789/4565 (http://hdl.handle.net/123456789/4565)
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