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Title:	Experimental demonstration of quantum contextuality on an NMR qutrit
Authors:	Dogra, S. (/jspui/browse?type=author&value=Dogra%2C+S.) Dorai, K. (/jspui/browse?type=author&value=Dorai%2C+K.) Arvind (/jspui/browse?type=author&value=Arvind)
Keywords:	Quantum contextuality NMR quantum computing Qutrit
Issue Date:	2016
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Citation:	Physics Letters, Section A: General, Atomic and Solid State Physics,380(22-23), pp.1941-1946.
Abstract:	We experimentally test quantum contextuality of a single qutrit using NMR. The contextuality inequalities based on nine observables developed by Kurzynski et al. are first reformulated in terms of traceless observables which can be measured in an NMR experiment. These inequalities reveal the contextuality of almost all single-qutrit states. We demonstrate the violation of the inequality on four different initial states of a spin-1 deuterium nucleus oriented in a liquid crystal matrix, and follow the violation as the states evolve in time. We also describe and experimentally perform a single-shot test of contextuality for a subclass of qutrit states whose density matrix is diagonal in the energy basis.
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