Title:	Experimental demonstration of the dynamics of quantum coherence evolving under a PT-symmetric Hamiltonian on an NMR quantum processor
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Abstract:	In this work, we study the dynamics of quantum coherence (total coherence, global coherence and local coherence) evolving under a local PT-symmetric Hamiltonian in maximally entangled bipartite and tripartite states. Our results indicate that quantum coherence in the bipartite state oscillates in the unbroken phase regime of the PT-symmetric Hamiltonian. Interestingly, in the broken phase regime, while the global coherence decays exponentially, the local and total coherences enter a “freezing” regime where they attain a stable value over time. A similar pattern is observed for the dynamics of total and local coherences in the maximally entangled tripartite state, while the dynamics of global coherence in this state differs from that of the bipartite state. Our study provides some novel insights into the independent contributions of global and local coherence to the freezing and oscillatory behavior of the total quantum coherence in both the unbroken and the broken phases, respectively. These results were experimentally validated for a maximally entangled bipartite state on a three-qubit nuclear magnetic resonance (NMR) quantum processor, with one of the qubits acting as an ancilla. The experimental results match well with the theoretical predictions, up to experimental errors.
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