

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Sudden Decoherence Transitions for Quantum Discord**<sup>1</sup> HYUNGGJUN LIM, ROBERT JOYNT, University of Wisconsin, Madison  
— We formulate the computation of quantum discord in terms of the generalized Bloch vector, which gives useful insights on the time evolution of quantum coherence for the open system, particularly the comparison of entanglement and discord. We present an efficient numerical method to calculating the quantum discord for a certain important class of multipartite states, and show that the analytical calculation of the global geometric discord is NP-hard in the number of qubits. In agreement with previous work for 2-qubit cases, (Mazzola *et al.* Phys. Rev. Lett. 104, 200401 (2010)), we find situations where under decohering influences there is a sudden transition from classical to quantum decoherence characterized by the discord remaining relatively robust until a certain point from which it begins decaying quickly. However, we find that as the number of qubits increases, the chance of this kind of transition occurring becomes small. This work was supported in part by ARO (W911NF-12-1-0607).

<sup>1</sup>This project was supported by DARPA-QuEst (MSN118850) and the ARO (W911NF-12-1-0607)

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Date submitted: 15 Nov 2013

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