Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Topological Classification of Types of Quantum Discord Evolutions[1] NGA NGUYEN, ROBERT JOYNT, Physics Department, University of Wisconsin-Madison, Madison, WI 53706 — Quantum discord is a type of quantum correlation that has recently attracted extensive attention. One question that is of experimental importance is how quantum correlations such as entanglement and discord are erased by external noise. A general classification of time evolution is seen to depend essentially on the understanding of the topology of the set C of concordant (zero-discord) states. In the 2-qubit case, we show that C is a 9-dimensional simply-connected manifold with boundary that can be embedded in the 15-dimensional space of 2-qubit density matrices. This yields 6 topologically distinct categories for the joint time evolution of entanglement and discord that exhaust all possibilities. We show that these 6 categories can be obtained in one physical model using independent or correlated random telegraph noise sources in the Markovian regime. Transition between these categories is of topological nature and is governed by changing physical parameters or initial conditions.

[1]Supported by DRPA-QuEst Grant No. MSN118850.

Nga Nguyen
Physics Department, University of Wisconsin-Madison,
Madison, WI 53706

Date submitted: 15 Nov 2012 Electronic form version 1.4