

Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Sorting Category: 5.1 (T)

Entanglement Evolution in the Presence of Decoherence¹ JIN WANG, HERMAN BATELAAN, JEREMY R. PODANY, ANTHONY F. STARACE, The University of Nebraska-Lincoln — The pairwise entanglement of a Heisenberg XY interacting spin chain in the presence of a uniform magnetic field and decoherence due to population relaxation is studied. The time dependent concurrence is analyzed both analytically and numerically for some typical initial states, including a separable (unentangled) initial state. An analytical formula for non-zero steady state concurrence is found for any initial state, and optimal parameter values for maximizing the steady state concurrence are given. We also distinguish the effects of global versus local coherence for this system. Since our model interaction Hamiltonian describes also mesoscopic objects that interact via their spins, it may be that a certain level of entanglement is robust against decohering interactions with an environment even for mesoscopic objects.

¹Supported in part by grants from the Nebraska Research Initiative and the W.M. Keck Foundation.

Prefer Oral Session
 Prefer Poster Session

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Date submitted: 08 Feb 2005

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