

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Spin decoherence of mobile impurity in a one dimensional spin bath TRITHEP DEVAKUL, ADRIAN FEIGUIN, Northeastern University — We study the spin decoherence of a mobile impurity interacting locally with a one dimensional spin bath. In contrast to the central spin model, where a single central spin interacts with the bath via long ranged interactions, our model considers only local exchange interactions, while allowing the impurity to move to neighboring sites via hopping t . We consider a spin-1/2 impurity, and study the decoherence, tracing over the position degree of freedom. In the large t limit, the delocalized impurity behaves identically to a localized spin interacting with the bath, same as a central spin. This model allows one to treat a central spin problem - which inherently builds up long-range entanglement within the bath - instead as a Hamiltonian with only local interactions. Numerical calculations are done at various regimes of parameters, and comparison with the central spin model is discussed.

Trithep Devakul
Northeastern University

Date submitted: 10 Nov 2014

Electronic form version 1.4