Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Percolation transition in quantum Ising and rotor models with sub-Ohmic dissipation[1] MANAL AL-ALI, Missouri University of Science and Technology, JOSÉ HOYOS, Instituto de Física de São Carlos, Universidade de São Paulo, THOMAS VOJTA, Missouri University of Science and Technology — We investigate the influence of sub-Ohmic dissipation on randomly diluted quantum Ising and rotor models. The dissipation causes the quantum dynamics of sufficiently large percolation clusters to freeze completely. As a result, the zero-temperature quantum phase transition across the lattice percolation threshold separates an unusual super-paramagnetic cluster phase from an inhomogeneous ferromagnetic phase. We determine the low-temperature thermodynamic behavior in both phases which is dominated by large frozen and slowly fluctuating percolation clusters. We relate our results to the smeared transition scenario for disordered quantum phase transitions, and we compare the cases of sub-Ohmic, Ohmic, and super-Ohmic dissipation.

[1]This work has been supported in part by the NSF under grant no. DMR-0906566, by FAPESP under Grant No. 2010/ 03749-4, and by CNPq under grants No. 590093/2011-8 and No. 302301/2009-7.

Manal Al-Ali
Missouri University of Science and Technology

Date submitted: 24 Oct 2012 Electronic form version 1.4