Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Quantum Phase Transition in a single-molecule Quantum Dot
N. ROCH, S. FLORENS, V. BOUCHIAT, W. WERNSDORFER, F. BALESTRO, Néel Institut, Grenoble, France, NANOSCIENCES DEPARTMENT COLLABORATION — Quantum criticality is the intriguing possibility offered by the laws of quantum mechanics when the wave function of a manyparticle physical system is forced to evolve continuously between two distinct, competing ground states. This phenomenon, often related to a zero-temperature magnetic phase transition, can be observed in several strongly correlated materials such as heavy fermion compounds or possibly high-temperature superconductors, and is believed to govern many of their fascinating, yet still unexplained properties. In contrast to these bulk materials with very complex electronic structure, artificial nanoscale devices could offer a new and simpler vista to the comprehension of quantum phase transitions. This long-sought possibility is demonstrated by our work in a fullerene molecular junction, where gate voltage induces a crossing of singlet and triplet spin states at zero magnetic field. N. Roch, S. Florens, V. Bouchiat, W. Wernsdorfer & F. Balestro, Quantum phase transition in a single-molecule quantum dot, Nature, 2008, 453, 633-637.

N. Roch
Néel Institut, Nanosciences Department BP166 38042 Grenoble Cedex 9

Date submitted: 18 Nov 2008 Electronic form version 1.4