Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Magnetic field induced mixed level Kondo effect in two-level quantum dots ARTURO WONG, U of Florida, ANH NGO, SERGIO ULLOA, Ohio U — Semiconductor quantum dots provide an easily tunable environment in which to investigate the Kondo effect. As it is known, Kondo correlations are suppressed by magnetic fields, showing e.g. a drop in the conductance of a quantum dot device. However, certain systems may exhibit an increasing conductance as a function of an applied magnetic field [1]. In this work we use the numerical renormalization group method to study a two-level quantum dot system with on-level and interlevel Coulomb repulsion, coupled to a single channel. When there is a finite detuning between levels, and a local singlet develops in one of them, the linear conductance of the device shows a maximum structure as a function of an in-plane magnetic field, which depends on the temperature of the system. This maximum occurs at a magnetic field strength such that the spin up state of one of the levels and spin down of the other are degenerate, allowing a "mixed level" Kondo effect. The respective spectral functions feature a resonance at the Fermi energy, commensurate with the Kondo physics. We discuss the properties of this mixed level Kondo state in terms of the detuning and the other parameters of the system.

[1] R. Sakano and N. Kawakami, PRB 73, 155332 (2006)

Arturo Wong
U of Florida

Date submitted: 23 Nov 2011 Electronic form version 1.4