Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Spectroscopy of the Kondo Problem in a Box
DENIS ULLMO, RIBHU KAUL, GERGELY ZARAND, SHAILESH CHANDRASEKHARAN,
HAROLD BARANGER, Duke U, Karlsruhe U, Budapest U, and LPTMS Orsay
— We study the spin quantum numbers and energy eigenvalues of the ground state
and low lying excitations of a quantum dot with a single spin-S impurity. We prove
an exact theorem that allows us to infer the ground state spin for an arbitrary spin-S
of the impurity and for even/odd electrons on the quantum dot. Additionally, strong
and weak coupling perturbation theory backed up with quantum Monte-Carlo simu-
lations enable us to map out the spin structure of the excited states and the energy
splittings between them as the ratio $\Delta/T_K$ is tuned. We propose a simple transport
experiment involving the tunneling spectroscopy of a double quantum dot, where
these results can be observed. Finally, we make explicit contact with experiment by
calculating the transport properties of the proposed double dot device that exhibit
signatures of tunneling into the Kondo-correlated state.

Denis Ullmo
LPTMS, Orsay

Date submitted: 30 Nov 2005

Electronic form version 1.4