

# Kondo effect in magnetic adatoms and quantum dots

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The screening of a local magnetic moment by itinerant electrons in metals creates a highly correlated *Kondo state*. Recent experimental advances in drastically different areas have fueled a renaissance in the study of this fascinating phenomenon: Coulomb blockaded quantum dots in semiconductors as well as magnetic adatoms and molecules on metallic surfaces have opened entirely new questions about the Kondo state that the condensed matter community is addressing intensely.

In this talk we will describe some of the open questions and interesting Kondo behavior made evident in beautiful STM experiments on surfaces. In particular, we will discuss the existence of a spatially extended Kondo signature in molecules with a magnetic atom, arising from charge transfer from the surface to the adsorbed molecule [1].

We will also describe theoretical predictions of finite-temperature experimental signatures of a quantum phase transition (QPT) as a suitably tuned double quantum dot system is brought into and through the right system conditions. These regimes can be reached *in-situ* by varying applied voltages that determine dot sizes and barriers, dot occupations, and the specific position of individual dot orbitals. This unique tunability allows one to explore the physics of QPTs in a single system, without the typical need to study different samples [2].

[1] U.G.E. Perera et al, unpublished.

[2] L. Dias da Silva, N. Sandler, K. Ingersent, and SEU, Phys. Rev. Lett. **97**, 096603 (2006); **99**, 209702 (2007); and Phys. Rev. B **78**, 153304 (2008).