Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Kondo effects and interference in transport through single molecules JENS PAASKE, KIM GEORG LIND PEDERSEN, PER HEDEGAARD, The Niels Bohr Institute, University of Copenhagen — Quantum transport through single molecules or quantum dot arrays with spin-degenerate ground states can be dominated by Kondo effects at low temperatures. In contrast to the single impurity case, quantum interference plays a significant role in such 'multi-orbital' systems and may have a strong influence on the possible Kondo physics: deciding between single- or multi-channel screening and even ferromagnetic Kondo effect. We investigate a range of smaller molecules with source, and drain electrodes attached in different specific contacting geometries. The interacting pi-electron system is treated by means of exact diagonalization, and combining with a perturbative treatment of molecule-lead tunnel couplings, we calculate the zero-bias cotunneling conductance as a function of a gate-voltage shifting the molecular levels. We show that interference nodes cannot occur simultaneously in potential, and exchange scattering terms, which means that interference causes no conductance nodes. Nevertheless, interference nodes in the exchange scattering term may lead to a non-standard gate dependence of the Kondo temperature, as indicated by experiments. We discuss the flow towards strong coupling and the possibilities for two-channel, and/or ferromagnetic Kondo effect.

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Date submitted: 14 Nov 2014 Electronic form version 1.4