Dynamic response of a Kondo dot in a photonic cavity

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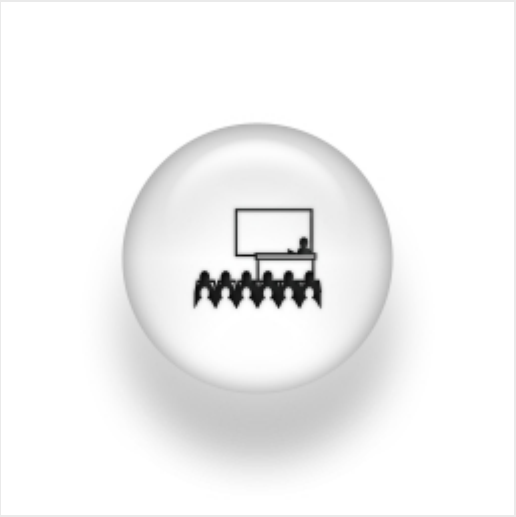

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ABSTRACT:
The Kondo effect is the paradigm for strongly correlated electronic systems. Recently, progress in nanofabrication techniques have made it possible to study this phenomenon at the single impurity level with exquisite sensitivity through transport measurement in artificial atoms- quantum dots. So far, most measurements have focused on low frequency properties. Probing such systems at frequencies comparable to the characteristic energy scales involved would allow to directly access the dynamic aspects of the Kondo resonance. In open space, the interaction of the electromagnetic field with a single Kondo “impurity” is a priori very small. In cavity quantum electrodynamics, single –real- atoms interact with photons thanks to the strong photon confinement. We used the same method with an artificial atom – a single wall carbon nanotube at low temperature- embedded in a microwave photonic cavity. We measure simultaneously the DC conductance and the two quadratures of the microwave signal (~GHz) scattered by the nanotube in the Kondo regime. The differences between the conventional transport spectroscopy and the “scattering phase” spectroscopy will be discussed [1].
[1] M.R. Delbecq et al., in preparation.