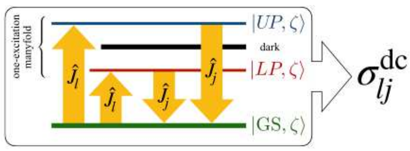
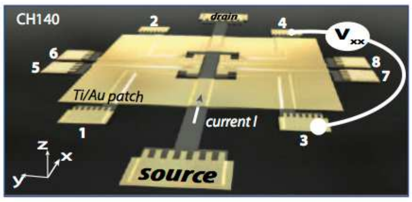
Seminario:

Giovedì 13 Giugno 2019

Aula B, DIFC, Via Archirafi 36, ore 16:00

Vacuum Effects on the Magnetotransport of a Cavity-Embedded Two-Dimensional Electron Gas





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Abstract

We present a theory pointing out the crucial role of virtual polariton excitations in controlling the dc charge transport properties of cavity-embedded systems. Specifically, we consider the linear magnetotransport of a cavity-embedded two-dimensional electron gas (2DEG) in the regime where no real photons are injected or created in the resonator. Our theory [1] shows that, for a cavity photon mode with in-plane linear polarization, the dc bulk magnetoresistivity of the 2DEG is anisotropic. For high filling factors of the Landau levels, we predict a profound modification in the envelope of the Shubnikov-de Haas oscillations, with the resistivity being increased or reduced depending on the system parameters. In the limit of low magnetic fields and in the ultrastrong light-matter coupling regime, the resistivity along the cavity-mode polarization direction is enhanced. To conclude, we will present the recent experimental observation [2] of some predictions of out theory.

[1] N. Bartolo and C. Ciuti, Vacuum-dressed cavity magnetotransport of a 2D electron gas, Phys. Rev. B **98**, 205301 (2018).

[2] G. L. Paravicini *et al.*, Magneto-transport controlled by Landau polarity states, Nat. Phys. **12**, 186 (2019).