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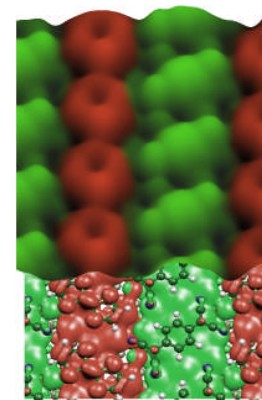
### Vibrational Kondo effect in charge-transfer organic layers

The charge transfer salt TTF-TCNQ is an organic metal with one-dimensional band structure and a rich low temperature phenomenology in bulk crystals. These properties change completely when ultra-thin layers of TTF-TCNQ are grown on a Au(111). Using a low temperature scanning microscope we find that the electronic structure of the TTF-TCNQ/Au(111) interface is characterized by a metal-organic hybrid electronic band [1]. Our results suggest that mixing of metal and organic states can build bands localized at the organic-metal interface having both molecular character and metallic-like mobility.

The donor-acceptor electron transfer crucially determines the molecular properties at the metal-organic interface. A Kondo resonance has been observed on TCNQ molecules of the film, revealing that this specie lies in an anionic radical state, with a spin 1/2 ground state, due to the localization of an unpaired electron in the conjugated lowest unoccupied molecular orbital [2]. This represents the realization of molecular magnetic materials using metal-free organic molecules. Furthermore, due to the  $\pi$  character of this singly-occupied molecular state, the unpaired electron is strongly coupled to molecular vibrations, leading to the split of the Kondo resonance in vibrational sidebands.

[1] N. González-Lakunza et al. Phys. Rev. Lett. 100, 156805 (2008).

[2] I. Fernández-Torrente, K.J. Franke, J.I. Pascual. Phys. Rev. Lett. 101, 217203 (2008).



TUESDAY 1<sup>st</sup> December at 3.00 pm

venue L5, Science Concourse