Correlation effects and magnetism in transport properties of single molecules

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Abstract:

The talk offers an overview about recent developments in the the field of Molecular Electronics. The focus will be on correlation effects introduced by the Coulomb interaction that the charge carriers feel when they flow through the molecule. Specifially, we will describe and discuss a scanning tunneling microscopy (STM) experiment [1] performed with an H2-phtalocyanine molecule (H2Pc). The measurement shows that the current-voltage curve is sensitive to the mutual alignment of the magnetization direction (paralell vs anti-parallel) of tip and substrate. The surprising aspect of the measurement is that in the absense of the molecule the magnetization effect is 5% only while in its presence we have 50% -- even though H2Pc is not magnetic. A theoretical analysis based on electronic structure calculations gives a quantitative explanation for this effect. At the end of the talk an outlook on other even more subtle magnetic correlation phenomena will be given [2].

Referances:

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Chandrasekhar, K. Fink, M. Ruben, F. Evers, *Spin-coupled double-quantum-dot behavior*
inside a single-molecule transistor, submitted (2010