

May 11th, 2012 - 11:00 am

Seminar Room 108, DESY Bldg. 49



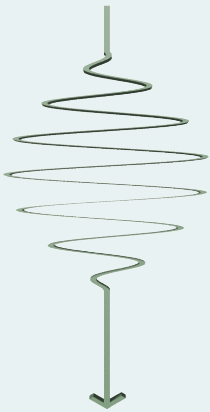
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Tuning Magnetic Interactions in Semiconductors by STM

Dilute magnetic semiconductors have the electrical properties of semiconductors while allowing for magnetic alignment of spins. In particular, manganese-doped gallium arsenide is a ferromagnetic semiconductor with a Curie temperature of ~200K. These manganese dopants act as electron acceptors while preserving a magnetic moment. Low-temperature (5K) scanning tunneling microscopy (STM) allows us to study these dopants individually. By moving point charges with atomic precision, we adjust the binding energy of single acceptors embedded into the surface, and tune the interaction between multiple acceptors. Because of the anisotropy of the zincblende crystal lattice of GaAs, the magnetic coupling between Mn dopants can be ferromagnetic or antiferromagnetic depending on the orientation of the acceptors. Control of this magnetic interaction will lead to deeper understanding of these dilute magnetic semiconductors, hopefully leading to designs for spintronic materials that can function at room temperature.



SEMINAR



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