

POZVÁNKA

na seminář oddělení 15 Fyzikálního ústavu AV ČR, v.v.i.

Seminář se koná

v úterý 26. listopadu 2013 ve 13:00

v zasedací místnosti budovy B Fyzikálního ústavu, Cukrovarnická 10,
Praha 6.

Na programu je přednáška

Nodal "ground states" and orbital textures in semiconductor quantum dots

kterou prosloví

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Abstrakt

Conventional understanding implies that the ground state of a non-magnetic quantum mechanical system should be nodeless. While this notion also provides a valuable guidance in understanding the ordering of energy levels in semiconductor nanostructures, there are reports that nodal ground states for holes are possible. However, the existence of such nodal states has been debated and even viewed merely as an artifact of a k - p model. Using complementary approaches of both k - p and tight-binding models, further supported by an effective Hamiltonian for a continuum model, we reveal that the nodal ground states in quantum dots are not limited to a specific theoretical model. Remarkably, the emergence of the nodal hole states at the top of the valence band can be attributed to the formation of the orbital vortex textures with energy levels largely insensitive to an overlap between s - and p -orbitals. We discuss how our findings and the studies of orbital textures could be also relevant for other materials systems.