Aharonov-Bohm interferometry with the T- shaped capacitively coupled quantum dots in the orbital Kondo regime

D. Krychowski and S. Lipiński

Institute of Molecular Physics, Polish Academy of Sciences
M. Smoluchowskiego 17, 60-179 Poznań, Poland

The magnetic field dependence of coherent transport through a pair of wires attached to two Aharonov-Bohm rings with embedded double dots (DQD) is considered. DQD consists of noninteracting dot (NQD) contacted to the leads and interacting dot (IQD) capacitively coupled with IQD from the second ring. The many-body problem is studied within the mean field slave boson approach and complementary by the equation of motion method in the limit of infinite inter and intradot Coulomb interactions of IQD. The transmission is strongly affected by the interference between the ballistic channels of the wires and the resonant channels from the IQDs. For symmetrically coupled DQDs the SU(4) Kondo effect occurs for vanishing magnetic field and a half-reflection is observed when the site energy of NQDs is equal to the Fermi energy (anti-Kondo resonance). Magnetic field strongly influences the correlations and interference. It breaks the spin degeneracy and a crossover to SU(2) Kondo physics in charge sectors results. The reflection becomes different for both spin channels (spin polarization of conductance). Increasing the field the destructive interference is replaced by constructive. The transmission is a periodic function of the flux. We analyze the linear conductance for different values of site energies and for different ratios of half circumferences of AB rings.

Name of the presenting author (poster): Damian Krychowski
e-mail address: krychowski@ifmpan.poznan.pl
url's: http://www.ifmpan.poznan.pl/