

Effect of RKKY interaction on the system of two magnetic atoms on a metal surface at finite temperatures

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Abstract: For a system of two magnetic adatoms on a metal surface at finite temperatures, we calculate the spectral density at adatom sites. At sufficiently low temperatures, the peak structure at the Fermi level, which originates from the coupling between the local moments of adatoms and conduction electrons, corresponds to the Yosida-Kondo resonance. In addition, we also consider the indirect Ruderman-Kittel-Kasuya-Yosida (RKKY) interaction between the adatoms, which is mediated by the conduction electrons of the metal surface, and depends strongly on the adatom separation. Under strong ferromagnetic (FM) RKKY interaction, the peak structure disappears, while under antiferromagnetic (AF) RKKY interaction, the width of the peak structure increases in comparison to that of the single adatom case. Our conclusion of the spectral density variation in the two dimensional system can be confirmed by experiments on the surface, for example by the scanning tunneling spectroscopy. © 2010 The Physical Society of Japan.

Author Keywords: Magnetic adatoms on surface; Quantum monte carlo simulation; RKKY interaction; Two impurity anderson model; Yosida-Kondo resonance

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