

21 世紀 COE セミナー

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場所:理学研究科H棟 6 階中セミナー室 (H601)

講師:Rodolfo A. Jalabert 教授 (Strasbourg 物性物理化学研究所・フランス)

題目:Relaxation mechanism for electron spin in the impurity band of n-doped semiconductors

概要:We propose a mechanism to describe spin relaxation in n-doped III-V semiconductors close to the Mott metal-insulator transition.

Taking into account the spin-orbit interaction induced spin admixture in the hydrogenic donor states, we build a tight-binding model for the spin-dependent impurity band. Since the hopping amplitudes with spin flip are considerably smaller than the spin conserving counterparts, the resulting spin lifetime is very large. We estimate the spin lifetime from the diffusive accumulation of spin rotations associated with the electron hopping. Our result is larger but of the same order of magnitude than the experimental value. Therefore the proposed mechanism has to be included when describing spin relaxation in the impurity band.

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