ENERGY OF SURFACE SPIN POLARON

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9.7 cm

The excitation spectrum in the ferromagnetic semi-infinite semiconductors is investigated whithin the framework of the s-d exchange model. Time Green function method is used to solve the above methioned problem and to obtain the spectrum of coupled surface waves. For simplicity we consider a simple cubic structure with the coordinate axis OY and OZ perpendicular and parallel to the surface of the crystal, respectively. For the translation symmetry reason, wave-vectors of both electron and spin waves in the plane parallel to the crystal surface, can be written as $\vec{k}=(\vec{k}_{\|}, \vec{k}_{\perp})$ $\vec{q}=(\vec{q}_{\|}, \vec{q}_{\perp})$. Analytical expression for the Green function is calculated on condition that $\vec{k'}_{\perp}$ - $\vec{k}_{\perp} = \vec{q}_{\perp}$, which can be used for the study of light absorption and scattering in semi-infinite conductive ferromagnets. We accept that parameters characterizing exchange interaction and energy of conduction electrons in the first and second layers of the crystals are different from the corresponding values for other layers. This proposal allows us to calculate $\vec{k}_{\perp}$ and $\vec{q}_{\perp}$, which charecterize the process of damping of the coupled waves. In the region of $\vec{q}_{\|} \to 0$ the direct dependence of the spectrum of the coupled waves on the energy of conduction electron disappears, but the indirect dependence remains for $\vec{k}_{\perp}$ and $\vec{q}_{\perp}$.

13.4 cm

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