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Author

Taguchi, K (Taguchi, Katsuhisa); Tatara, G (Tatara, Gen)

Title

Theory of inverse Faraday effect in a disordered metal in the terahertz regime

Source

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Abstract

We calculate the magnetization induced by the inverse Faraday effect in disordered metals in the terahertz regime by using a diagrammatic method. The process of the transfer of the angular momentum of the incident light, first to the electron's orbital motion via the gauge coupling and then to the electron's spin via the spin-orbit interaction, is studied by evaluating Feynman diagrams. The spin-orbit interaction is included perturbatively to the first order. The induced magnetization is shown to be proportional to both the circular polarization and the frequency of the incident terahertz light.