DIPOLE-EXCHANGE SPIN-WAVE SPECTRUM OF THE DYNAMIC MAGNONIC CRYSTAL ON TERAHERTZ FREQUENCIES

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9.7 cm

The planar magnetic periodic structures (magnonic crystals) based on the magnetic thin films provide favorable possibilities in reduction of the device dimensions and in the development of novel high-frequency devices. The dynamic magnonic crystals represent a type of the structures that can be formed dynamically in ferromagnetic waveguiding system, for example, by switching on and off an external periodic magnetic field. The easy-tuning dispersion characteristics and the possibility of using highly anisotropic ferromagnetic (e.g., hexaferrite) film as a waveguiding element makes such structures very attractive for applications in terahertz signal processing.
Here we present an analytical theory of the dipole-exchange spin-wave spectrum for the dynamic magnonic crystal, which is formed on the basis of the hexaferrite film with strong uniaxial magnetic volume anisotropy by applying a small spatially-periodic magnetic field simultaneously with the uniform bias magnetic field. In constructing the theory, a strong uniaxial volume anisotropy, as well as arbitrary surface spins pinning conditions are taken into account. The theoretical investigation is illustrated by several relevant numerical calculations.

13.4 cm

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