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# Magnons and phonons BLS investigations in bilayer substituted YIG samples of complex magnetic configuration

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Brillouin light scattering (BLS) was used to determine dispersion relation of thermal magnons which exist in two layered sample. On the monocrystalline gadolinium gallium garnet (GGG) substrate two magnetic layers were grown: the bottom layer $(GdLu)_3(FeGa)_5O_{12}$ with magnetization direction in plane (easy plane) and the top layer $(YBiLuSmGd)_3(FeGa)_5O_{12}$ with magnetization direction out of plane (easy axis) [1]. The value of the applied magnetic fields caused monodomenization of the first and then the second magnetic layer. In the backward scattering geometry, the dispersion relation of thermal magnons and phonons were determined for different values of magnetic field. The obtained dispersion dependencies indicate the existence of a different number of spin waves depending on the degree of sample monodomenization. A hybridization of the dispersive relation of spin wave and surface acoustic waves was also observed. The finite element method (FEM) was used for interpretation of the experimental results [2,3].

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