MECHANISMS OF GAP SOLITONS FORMATION IN PERIODIC FERROMAGNETIC STRUCTURES

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9.7 cm

In the present work the features of envelope soliton formation in one-dimensional periodic ferromagnetic structure (magnonic crystal) were considered. The magnonic crystals have a number of significant advantages compared to the photonic crystals - the ability to manage their properties by an external magnetic field; creating crystals with magnon bandgap at microwave frequencies (of the order of several millimeters). The nonlinear effects in ferromagnetic films appear at relatively low power levels. A model based on coupled nonlinear Schrodinger equations was used to calculate the parameter spaces corresponding to solitons, similar to Bragg solitons, with different properties. The basic mechanism of formation of Bragg-like soliton and soliton localized on the limited length of structure represents the mutual capture of pulses on forward and backward waves. These pulses move with the cumulative velocity and presence of power swapping between forward and backward waves which is defined by value coupling between the waves. Features of wave evolution depending on coupling parameter and group velocity are investigated. The parameter spaces corresponding to the formation of Bragg-like solitons and solitons localized on the limited length of structure at different ways of excitation of the periodic structure were calculated.

13.4 cm

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