Magnetostatic spin waves propogation in two-dimensional wedge magnonic crystal

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Magnonic crystals (MC) are materials with periodically modulated magnetic parameters and they are spin-wave counterpart of photonic crystals. The study of MC has been intensively growing recently, nonetheless there is no general theory of magnetostatic wave propagation in 2D periodic structures. In our work we have studied surface magnetostatic wave propagation in 2D magnetic multi-layered structure. We assume that thickness of the structure linearly depends on MC length. Such dependence upon element of the structure prevents us from applying Blochs theorem in determining the spectrum of the magnetostatic waves. We use transfer matrix method (TMM) for calculating transmission and reflection spectrum of magnonic crystal. The spectrum of magnetostatic waves in 2D MC forms band structure with forbidden gaps. We have found forbidden band gap width and position dependence on the angle of the wave vector with characteristic axes of the wedge 2D magnonic crystal. It has also been found dependence of the band gaps width and position on angular wedge parameter. For large values of the angular parameter forbidden band gaps in spectrum of magnonic crystal are blurred out due to violations of the Braggs resonance condition.

9.7 cm

13.4 cm

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