

Band gap properties in one-dimensional YIG magnonic crystals

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We studied the properties of forbidden band gaps in the spin wave (SW) dispersion in one-dimensional 1D magnonic crystals (MCs) based on the yttrium iron garnet (YIG) film. Two MCs structures were investigated: YIG film with array of grooves or gold stripes placed a top. The Vector Network Analyzer transmission measurements were confronted with the Finite Element Method calculations [New J. Phys. 15, 113023 (2013)]. A different position and width of the gaps is observed experimentally and theoretically in structures with metal stripes, due to the existence of the exchange Bragg gaps. A two characteristic of SWs gaps are analyzed, i.e., the frequency position of the magnonic band gap and the width of the gap. Further, the width of the gap studied independence on both structures of the external magnetic field, both theoretically and experimentally. Supported by: Team SYMPHONY project of the FNP, co-financed by the EU from ERDF, OPIE 2007–2013.