Spin wave propagation properties in planar Magnonic Crystals

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In recent years, Magnonic Crystals (MCs) emerged as new class of materials with periodically modulated magnetic properties where allowed bands and ranges of forbidden gaps can be recognized in the dispersion curves of spin excitations. Magnonics or magnons spintronics is the corresponding research field whose purpose is to explore spin waves to store, carry and process information.This offers an unprecedented opportunity to design and exploit a new generation of spin logic devices, filters and waveguides operating in the GHz frequency range. However, knowledge of the magnonic band structure of a specific MC is preliminary to any desired application. In this work, we use Brillouin light scattering (BLS) technique to investigate the spin wave band structure in 1D and 2D discrete and continuous MCs constituted either by ordered arrays of magnetic elements interacting via the dynamic dipolar interaction or by a continuous medium with a periodical profile of magnetic properties. The research leading to these results has received funding from the European Community (FP7/2007-2013) under Grant Agreement no. 228673 (MAGNONICS).