Poster Session C

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P-C.174

Oblique propagation of spin waves in 1D magonic crystal

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Text We investigated the propagation of spin waves in one-dimensional planar magnonic crystal which has a form of magnetic layer with periodic modulation in one direction only[1, 2]. The magnetic field is applied in-plane, perpendicularly to the direction of periodicity. We considered the general case of oblique propagation where each spin wave eigenmode can be decomposed into plane waves and Bloch waves for two orthogonal directions (perpendicular and parallel to the direction of periodicity). The Plane Wave Method was used to find the dispersion relation which gives us the information about the magnonic band gaps and allowed directions of propagation. The numerical calculations for dispersion relations were carried out using semi-analytical approach. We solved eigenvalue problem for linearized Landau-Lifshitz equation, where sought solutions of dynamic component of magnetization and material parameters i.e. exchange length and magnetization saturation are expanded analytically into Fourier series.
We showed how to tune the intrinsic anisotropy of dipolar spin waves by introducing the one-dimensional periodic modulation of material or structural parameters.

[1] J. Rychły et al., Phys. Rev. B (2015)
[2] R. A. Gallardo et al., arXiv:1610.04176 (2016)

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