

The role of demagnetizing field in the formation of spin-wave spectrum in finite-width magnonic structures

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In the last few years a set of reports about experimental study of spin-wave propagation in confined ferromagnetic structures were published [1,2]. Authors pointed out that some observed effects and dependences cannot be described in the frames of commonly used analytical approach. In this work, with the help of recently elaborated theory [3], we explain several experimental cases appeared in literature which concerned with the different finite-width structures: regular magnonic waveguide, waveguide with variable width, waveguide with periodically modulated width. We show the evidence of localized states appeared in spin-wave spectrum of the confined structures and describe their frequency dependence on the external magnetic field and the parameters of the structure.

References:

- [1] V. E. Demidov, J. Jersch, S. O. Demokritov, K. Rott, P. Krzysteczko, G. Reiss, Phys. Rev. B 79, 054417 (2009)
- [2] T. Sebastian, T. Bracher, P. Pirro, A. A. Serga, B. Hillebrands, T. Kubota, H. Naganuma, M. Oogane, Y. Ando, Phys. Rev. Lett. 110, 067201 (2013)
- [3] N. Grigoryeva, D. Popov, B. Kalinikos, EPJ Web of Conf. 40, 12004 (2013)