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Abstract

Spin Wave Modes in a Cylindrical Nanowire in Crossover of Dipolar-Exchange Regime †

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Although the magnetic wires have been [1] broadly investigated, some of their dynamical properties, like: (anti)crossing between the spin wave modes and the impact of the magnetic field on the spin wave spectrum, still need to be explored. In our studies [2] we identify the dispersion branches and their (anti)crossings (see Figure 1) in crossover of the dipolar-exchange regime by plotting the spatial profiles of spin waves and respective magnetostatic potentials. We also check how we can tune the spectrum of the modes by application of the external magnetic field and how it affects the dominating type of interaction. We use two approaches for solving the Landau-Lifshitz equation: semi-analytical calculations and numerical computations based on the finite element method.

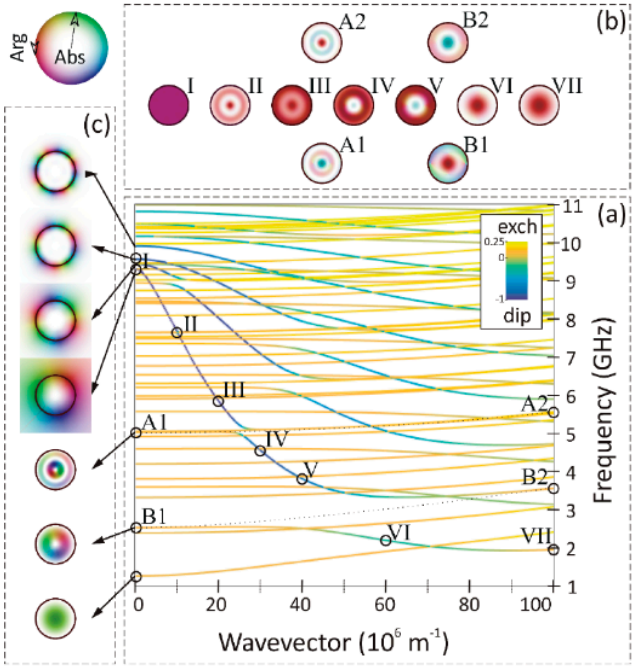

Figure 1. (**a**) Dispersion relation of cylindrical (60 nm-radius) Ni nanowire magnetized along its axis in the absence of an external field and the profiles of (**b**) dynamic magnetization, and (**c**) magnetostatic potential for selected spin wave modes.

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