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Splitting of spin-wave modes in magnetic nanostructures under axial symmetry violation MARTHA PARDAVI-HORVATH, George Washington Univ, OLENA TARTAKIVSKA, OLGA SALYUK, Institute of Magnetism NASU and MESU — During the last two decades the spin wave dynamics in magnetic nanostructures is a topic of intensive study. However, the analytical theoretical description of spin waves in such confined structures is a complicated problem. Due to the inhomogeneity of the internal demagnetizing field, it is possible to find exact eigenfunctions for only selected cases with the simplest geometries. For practical applications the direction of the external magnetic field may deviate from the symmetry axis. Additional spin-wave modes can be the source of magnetic noise. Therefore, it is important to investigate the evolution of the spin wave spectra in the case of symmetry violation. In this work the evolution of spin wave spectra of submicron circular dots and cylindrical nanowires have been studied for the case when the magnetic field deviates from the symmetrical (parallel to the normal) direction. It is shown that for such geometry the symmetry violation leads to a splitting of spin-wave modes, and that the number of the split peaks depends on the mode number. A quantitative description of the spectra is given using a simple perturbation theory. The role of boundary conditions (pinned, mixed or free) is discussed.

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