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Magnon characterization in magnetic quantum dots MOHAMMAD-REZA MOZAFFARI, KEIVAN ESFARJANI, Dept. of Physics, Sharif University of Technology, Tehran, Iran — The spin structure in a magnetic dot is studied as a function of exchange coupling strength or dot size, within the semiclassical approximation on a discrete lattice. In addition to the exchange term, the dipole interaction has also been included in our calculations. As the exchange coupling is decreased or the size is increased, the ground state undergoes a phase change from a single domain ferromagnet to a spin vortex. The line separating these two phases has been calculated numerically for small system sizes. Magnon frequencies in such a dot have also been calculated in both phases by the linearized equation of motion method. These calculations have also been checked by comparing them to the spin autocorrelation function spectrum. Furthermore, the modes have been characterized for both the ferromagnetic and the vortex phase. The modes responsible for the instability of the vortex and the ferromagntic phases have been identified, and can provide the mechanism for spin reorientation in these phases.

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