Spin wave excitations of the interacting two-dimensional in-plane nano-vortices

S. Mamica[1]

[1] *Faculty of Physics, Adam Mickiewicz University in Poznań*

The aim of this work is to study spin-wave excitations in the system of interacting two-dimensional nanodots in the vortex state. We use a discrete dipole model taking into account the nearest-neighbour exchange and dipolar interactions [1]. Magnetic configuration of each dot is assumed to form an in-plane vortex (circular magnetization). We examine the dependence of the frequencies and profiles of spin-wave modes vs. the dipolar-to-exchange interaction ratio, the size of the dot, and the dot separation. Special attention is paid to some particular modes, including the lowest-frequency mode, the localized modes, and the fundamental mode, an analogue of the uniform excitation. Some conclusions regarding the influence of the chirality of neighbouring vortices are provided as well.

References:

[1] S. Mamica, "In-plane magnetic vortices in two-dimensional nanodots" in "Magnetic Structures of 2D and 3D Nanoparticles: Properties and Applications" ed. J.-C. S. Lévy, Pan Stanford Publishing, Singapore 2016.

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 644348.