MFA_exampleREADME

The MFA is a multi-type Fourier analysis program for the results of micromagnetic simulations. Here we only introduce how to run the example via job control script. The way using GUI is similar to the way using script and can be easily comprehended. The example is a classic magnonic crystal problem reported in [1]. The data is stored in the directory named "Example_Input". Note that in order to ensure the execution of the example, the free memory space of user's computer should be more than 700 MB. In default setting, MFA will utilize all of CPU cores of user's computer. This may raise some instability, especially for some old computers. Thus, we recommend that user sets 'CoreNum' parameter to a number which is less than the number of core possessed by the CPU.

First, open the file named "MFA_Multicores.py" by arbitrary text editor, e.g. Vim. Then, Input the absolute path of the directory in which data is stored. For users of Windows system, please use "\\" or "/" instead of "\".

1. FFT analysis

Save this change and run this file. After minutes of wait (the time cost depends on the performance of the computer), a frequency spectrum that shows the frequency composition of the spin wave propagating in the magnonic waveguide will display and be auto-saved in this directory as "FFT power.eps".

2. Frequency spectrum analysis (Spectrum)

Open the file and change the value of 'x_start' (in 'General geometry parameters' section) to 100e-9. Then, turn to the 'General control' section. Assign "0" to 'FFT_Switch' and 'Dispersion_Switch'. Set 'Spectrum_Switch' to "1". Save the change and run the file. After minutes of wait, a colormap that shows the spatial distribution of the spin-wave power at different frequencies along the direction of wave vector will display and be auto-saved in this directory as "Frequency spectrum.eps".

3. Dispersion curve analysis

Open the file and change the value of 'x_start' (in 'General geometry parameters' section) to 600e-9. Then, turn to the 'General control' section. Assign "0" to 'FFT_Switch' and 'Spectrum_Switch'. Set 'Dispersion_Switch' to "1". Save the change and run the file. After minutes of wait, a dispersion curve will display and be auto-saved in this directory as "Dispersion curve.eps". If user want to use window function in the calculation, the only thing to do is setting 'Win' to "1" before run the file.

Reference:

[1] K. S. Lee, D. S. Han, S. K. Kim, Phys. Rev. Lett. 102 (2009) 127202.