16th IUVSTA International Summer School on Physics at Nanoscale



Contribution ID: 27

Type: poster

Switching of Confined Antiskyrmions Under Circular Magnetic Fields

Magnetic antiskyrmions may occur in cases where the magnetic chirality is anisotropic. In another word, DMI with opposite signs along two perpendicular directions can stabilize antiskyrmions [1]. They were theoretically predicted in certain tetragonal materials with D2d symmetry [2]. This topological spin structure plays a crucial role in low dimensional magnetic systems, where topological features dominate their magnetic and dynamic properties. Utilizing micromagnetic simulations, we investigate the dynamics and switching of confined topological spin textures, in particular antiskyrmions. The ability of a controlled switching of the polarity of these objects is essential for their potential applications in novel devices First, after stabilizing a single skyrmion in a magnetic field. We show that the antiskyrmion can be switched with a minimum field amplitude of H0 = 40 kA/m. This threshold amplitude depends on materials parameters. The results show that the proposed circular field is also capable of switching of an antiskyrmionium to another antiskyrmionium with different polarity and the switching is favored for materials with a smaller damping parameter.

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Session Classification: Posters

Track Classification: Spins and spin waves