

Novel functionalities using magnetic skyrmions in nanorings

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Abstract: Magnetic skyrmions are spatially localised whirling configurations of the magnetization that hold promises as novel information carriers in modern spintronics devices. Here, we present the basic concepts related to the physics of magnetic skyrmions and the numerical micromagnetic method that is thoroughly used to study their dynamics under a driving electrical current or an internal gradient of the hosting material.

As a case study, we present numerical studies of skyrmions in magnetic nanorings which are promising nanostructures to be implemented for electric-pulse generation in the GHz regime or energy harvesting. Finally, the simulations are linked to proposals for skyrmion-based spintronics devices.