

# 3D magnetic nanostructures for spintronics

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The expansion of nanomagnetism to three dimensions provides exciting opportunities to explore new physical phenomena and opens great prospects to create 3D magnetic devices for green computing technologies.

In this talk, I will present some of our recent work dedicated to the investigation of three dimensional artificial magnetic materials, including multilayered and complex-shaped geometries. The talk will give an overview of the new methods we have developed to fabricate and characterize these nanomaterials, and some of the new functionalities obtained. This includes the creation of localized spin textures, topological defects and stray fields exploiting geometrical effects, the automotive 3D motion of domain walls, and the generation of chiral spin interactions via geometry and interfacial effects.

- [1] A. Fernández-Pacheco et al, Nature Comm. 8, 1 (2017).
- [2] A. Fernández-Pacheco et al, Nature Mater. 18, 679 (2019).
- [3] L. Skoric, Nano Letters 20, 184 (2020).
- [4] D. Sanz-Hernández et al, ACS Nano 11, 11066 (2017).
- [5] L. Skoric et al, ACS Nano 16, 8860 (2022)
- [6] F. Meng et al, ACS Nano 15, 6765 (2021).
- [7] D. Sanz-Hernández et al, ACS Nano 14, 8084 (2020).
- [8] C. Donnelly et al, Nature Nanotechnol. 17, 136 (2022).

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