

Magnetic skyrmions in chiral magnets

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Magnetic skyrmions have been subject of intense research due to their interesting physics and potential in spintronic applications. In the context of magnetism, skyrmions are topological magnetic spin textures in which the moments have a vortex-like swirling structure. These skyrmions present as tubes stretching throughout the magnetic sample. A cross-section of the tube shows the spins smoothly rotate with their magnitude fixed so that they cover the entire unit sphere of magnetisation. In other words, the magnetisation of an isolated skyrmion can be mapped onto the surface of a three-dimensional unit sphere where there is a single moment pointing in each direction. The topological nature of magnetic skyrmions lead to interesting properties and physical effects that have potential uses in future devices.

In this talk I will introduce the concept of magnetic skyrmions, their origin, and the physics behind these magnetic objects. We will briefly look into experimental realisations of magnetic skyrmions in materials studied at Warwick [1, 2], the computational methods used to study magnetic skyrmions [3, 4], and the interesting properties of skyrmion that make them interesting for device applications [5].

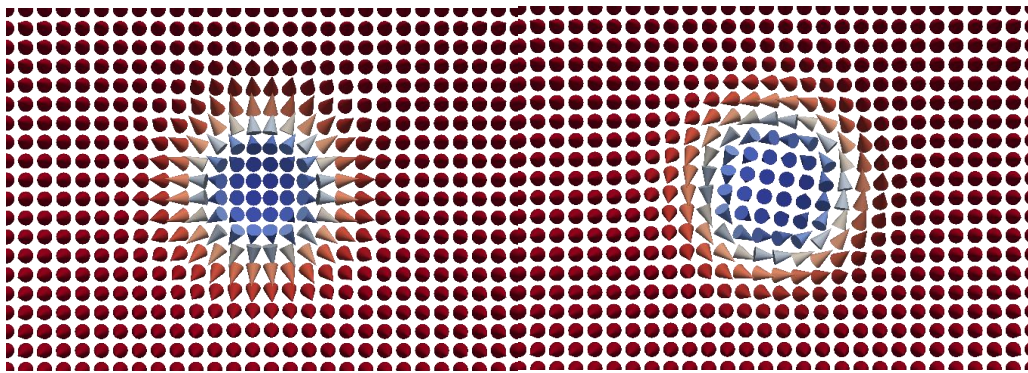


Figure 1. Left: Néel skyrmion and Right: Bloch skyrmion.

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- [3] M. Beg *et al.*, IEEE Trans. Magn. **58**, 7300205 (2022).
- [4] <https://ubermag.github.io/>
- [5] A. Fert *et al.*, Nat. Nanotechnol. **8**, 152 (2013).