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Editorial

Topological Spin Textures and Their Applications

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Topological spin textures have been an extremely hot topic since their first experimental observation in 2009 [1], and they have also been found to be strongly related to many intriguing magnetic and spintronic phenomena [2–6]. Typical topological spin textures include skyrmions in two-dimensional (2D) nanostructures and hopfions in three-dimensional (3D) nanostructures [5,6]. In principle, all topological spin textures stabilized in magnetic materials can be used to carry information, and thus are potential building blocks for future magnetic and spintronic applications [2–6]. For example, both theoretical and experimental works have suggested that skyrmions can be used as key components in conventional spintronic devices, such as racetrack-type memory and logic computing gates [2–6]. Recent works also suggested that skyrmions can be used for unconventional applications, including information entropy holders [7,8], random bit generators [9], and neuromorphic computing [10]. Moreover, some recent theoretical reports have pointed out the possibility that skyrmions can be used as qubits for quantum computing [11]. Therefore, it is envisioned that both 2D and 3D topological spin textures will have more impact on magnetic and spintronic applications in the coming years. In this Special Issue, we will highlight the newly discovered properties of different species of topological spin textures as well as their potential applications. This editorial is a call for theoretical and experimental papers related to novel studies on 2D and 3D topological spin textures.

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