



Magnetism

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an Open Access Journal by MDPI

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CiteScore: 2.0

Impact Factor (Tracked)%

Special Issue Reprint

## Mathematical Modelling and Physical Applications of Magnetic Systems

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This Reprint deals with a comprehensive review of the recent progress in **Mathematical Modeling and Physical Applications of Magnetic Systems**.

It includes complex spin textures at the magnetic nanoscale, focusing on static and dynamic states, mainly on topological spin textures. This Reprint is a pioneer of theoretical modeling, numerical simulations, and experimental implementation. The framework focuses on 3D topological spin textures (hopfions, torons), as well as 2D ones (skyrmions, antiskyrmions, and bimerons). It takes into account the statics, dynamics, stability, interactions, and manipulation of these structures, implemented in modern magnetic devices and systems. Fundamental physics and technological innovation have been harnessed for spintronic and magnonic applications, logic gates, magnetic memory, and quantum computing states. Challenging tasks have been addressed, such as engineering magnetic spin textures for practical applications at the nanoscale, with low power dissipation, as well as rigid objects under thermal fluctuation. These three-dimensional (3D) and two-dimensional (2D) topological spin textures are robust and cannot be deformed trivially into other spin textures such as ferromagnets. The theory, modeling, and experiment in the Reprint are presented for scientific researchers, engineers, and students. The primary challenge reaching a wide audience focusing on magnetic phenomena, enabling work towards a compelling future for nanotechnological applications.



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