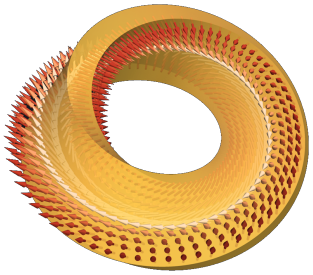

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# Effect of Curvature on Topological Defects in Chiral Magnets and Soft Matter

*Thursday, 23 May 2019 09:45 (30 minutes)*

The interplay of geometry and topology underlies many novel and intriguing properties of a variety of soft and hard materials including biological vesicles, nematic liquid crystals and chiral magnets. These materials harbor a gamut of topological defects ranging from domain walls, disclinations, solitons, vortices, skyrmions and merons to monopoles, Dirac strings, hopfions and boojums among many others. I will illustrate this rich interplay with three distinct physical examples. (i) Either the change in the underlying curved manifold or the variation of the Dzyloshinskii-Moriya interaction (DMI) with curvature in magnetic systems. (ii) Controlled motion of liquid crystal skyrmions near curved boundaries using the Q-tensor (as opposed to director) based free energy where the twist acts as the analogue of DMI. (iii) Deformation of biological membranes and vesicles using Canham-Helfrich free energy and Bogomol'nyi decomposition technique to determine equilibrium shapes. Finally, I will briefly describe specific applications of these ideas in spintronics, memory devices as well as drug delivery systems and active matter.

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