

Possible 3D Skyrmion Lattice in Chiral Magnet

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We calculate the energies of various multiple-spiral spin configurations for the three-dimensional model of chiral magnets. The ground-state phase diagram is obtained in the space of anisotropy, magnetic field, and interaction parameters. Regimes with multiple-spiral, or Skyrme crystal spin ground states are identified. The uniform chirality, responsible for anomalous Hall effect, is examined for the Skyrme crystal configurations. A geometric interpretation is given for the three-dimensional Skyrmion lattice structures as the periodic arrangement of hedgehog singularities.