Structural transitions in crystals

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The Landau-Lifshitz-Lyubarski (LLL) theory of second order phase transitions has not yet been applied to magnetic crystals. Transitions in magnetic crystals require description in terms of magnetic groups and their corepresentations. Here we have extended and developed the theory of second order phase transitions in magnetic crystals. Our theory has been applied to garnets of O_h^{10} (Ia3d) calclium aluminum orthosilicate $Ca_3Al_2(SiO_4)$. In addition, we also investigated transitions in rocksalt ZnO of O_h^5 symmetry. Our theoretical results are in good agreement with available experimental data such as powder neutron, x-ray diffraction and Raman spectroscopy.