Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Goldstone mode in the conical phase of helical magnets YAN SANG, D. BELITZ, Department of Physics, and Institute of Theoretical Science, University of Oregon, Eugene, OR 97403, T.R. KIRKPATRICK, Institute for Physical Science and Technology, and Department of Physics, University of Maryland, College Park, MD 20742 — We investigate theoretically the nature of the Goldstone mode in the conical phase of helical magnets such as MnSi. A Dzyaloshinsky-Moriya term in the action leads to helical order in the ground state, characterized by a pitch vector $\vec{q}$ [1]. The Goldstone mode in the helical phase, the helimagnon, is known to have an anisotropic dispersion relation of the form $\Omega^2 \propto k_z^2 + k_\perp^4/q^2$, analogous to smectic or cholesteric liquid crystals [2]. In the presence of a homogeneous external magnetic field H the helix is superimposed by a homogeneous magnetization, which leads to a conical phase [3]. The Goldstone mode in the latter is found to be a modified helimagnon, with a dispersion relation of the structure $\Omega^2 \propto \Omega_0^2 + H^2 k_\perp^2$. The additional term $\propto H^2 k_\perp^2$ is a result of the magnetic field breaking the rotational symmetry. In addition, there are remnants of ferromagnetic magnons with masses $\propto H^2$.

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Date submitted: 01 Dec 2009 Electronic form version 1.4