Adiabatic sound velocity in the vicinity of the phase transition in magnets

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9.7 cm

The Ginzburg-Landau Hamiltonian of a magnetic system, containing magneto-elastic as well as entropo-elastic interactions in addition to usual magnetic ones, is considered in detail. Adiabatic longitudinal sound velocity is defined by the pressure correlation function and is found to be finite at the phase transition temperature in contrast to the behaviour of the isothermal sound velocity which goes asymptotically to zero. A weakly-singular contribution to adiabatic sound velocity is also found. We show that it can be expressed entirely in terms of the static spin-energy vertex function evaluated with an effective spin Hamiltonian. The vertex function is found to exhibits a $(T - T_C)^\alpha$ singularity.

13.4 cm

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