

THE QUADRUPOLE PHASE IN A MAGNET WITH ANISOTROPIC BIQUADRATIC EXCHANGE

I.P. Shapovalov

I.I. Mechnikov Odesa State University
(2, Dvoryans'ka Str., Odesa 270100, Ukraine;
e-mail: *dtp@paco.net*)

S u m m a r y

The quadrupole phase in a uniaxial magnet with single-ion anisotropy of the easy-plane type and the anisotropic biquadratic exchange interaction is investigated. The case where the spin at a site equals unity is considered. A new method for the calculation of the spectrum of spin excitation modes at finite temperatures is proposed. It is shown that, in the limit case where $T = 0$, the results obtained are in full compliance with those reported by other researchers. The expressions for two branches of the spin excitation spectrum at finite temperatures are obtained, and the stability conditions for the spectrum modes are determined. The temperature, at which the stability of the spectrum modes breaks, is determined analytically as a function of the Hamiltonian parameters. It is proved that, under certain conditions as the temperature is lowered, the stability of the modes of the spin excitation spectrum first breaks and then is restored. The existence of a metastable state is predicted.