Dynamic Dipole and Quadrupole Phase Transitions in the Kinetic Metamagnetic Spin –3/2 Blume-Emery-Griffiths Model

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We study, within a mean-field approach, the stationary states of the kinetic metamagnetic spin $-3/2$ Blume-Emery-Griffiths model under the presence of a time-varying (sinusoidal) magnetic field. We use the Glauber-type stochastic dynamics to describe the time evolution of the system. The behaviour of the time dependence of the average order parameters in a period, which are also called the dynamic order parameters, as functions of the reduced temperature are investigated. The natures (continuous or discontinuous) of the transitions are characterized by investigating the behaviours of the thermal variations of the dynamic order parameters. The dynamic phase transition points are obtained and the phase diagrams are constructed in the plane of the reduced temperature (T) and the amplitude of the magnetic field (h), and sixteen fundamental types of phase diagrams are found. The phase diagrams exhibit one, two, three or four dynamic tricritical points and a dynamic double-critical end point, and, besides a disordered and three ordered phases, seven coexistence regions or mixed phases depending on the interaction parameters. We also investigate the influence of the reduced biquadratic exchange parameter (k) and obtain nine different phase diagram topologies in the (k, T) plane.

Key words: Dynamic Phase Transition; Glauber-Type Stochastic Dynamics; Spin $-3/2$ Metamagnetic BEG Model; Dynamic Phase Diagrams.
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