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Topic: Non-equilibrium Statistical Physics Preference: Oral

Kinetics of a mixed spin-1 and spin-3/2 Ising system under a time-dependent oscillating magnetic field[†]

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We present a study, within a mean-field approach, of the kinetics of the mixed spin-1 and spin-3/2 Ising model Hamiltonian with bilinear and biquadratic nearest-neighbor exchange interactions and a single-ion potential or crystal-field interaction in the presence of a time-dependent oscillating external magnetic field [1]. We employ the Glauber transitions rates to construct the mean-field dynamical equations. We investigate the time dependence of average magnetizations and the quadrupole moments, and the thermal behavior of the dynamic order parameters. From these studies, we obtain the dynamic phase transition (DPT) points and construct the phase diagrams in three different planes. Phase diagrams contain disordered (d), ferrimagnetic (i), the antiquadrupolar or staggered (a) phases, and four coexistence or mixed phase regions, namely the i+d, i+a, i+a+d and a+d, that strongly depend on interaction parameters. The system also exhibits the dynamic tricritical behavior in most cases, the reentrant behavior in few cases. The results are compared with the single counterparts, namely kinetic spin-1 [2] and spin-3/2 [3] Ising systems, and as well as two sublattice kinetic spin-1 [4] and spin-3/2 Ising systems [5].

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