Chaos and field behavior of the Blume-Capel model with competing interactions on the Bethe lattice

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We study the Blume-Capel model with competing interactions J_1 and J_2 on a Bethe lattice, in the infinite-coordination limit, in the absence and in the presence of external magnetic field H. The three-dimensional mapping of the model exhibits rich phase diagrams with ferromagnetic, paramagnetic and modulated phases. In the presence of magnetic field we find modulated phases "bubbles" with complex structures, surrounded by a paramagnetic phase and co-stability para-modulated regions. For some values of the crystalline and the magnetic fields, chaotic phases are found. In this case, we apply the 0-1 test for chaos and calculate the Feigenbaum constant δ. [1, 2, 3]

References

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