

Effective-Field Theory on High Spin Systems with Biaxial Crystal Field

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Abstract: Based on the effective-field theory with self-spin correlations and the differential operator technique, physical properties of the spin-2 system with biaxial crystal field on the simple cubic, body-centered cubic, as well as faced-centered lattice have been studied. The influences of the external longitudinal magnetic field on the magnetization, internal energy, specific heat, and susceptibility have been discussed in detail. The phenomenon that the magnetization in the ground state shows quantum effects produced by the biaxial transverse crystal field has been found.

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Key words: effective-field theory, magnetic properties, biaxial crystal field, quantum effects

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