

Observation of coupled 4f-electron-phonon excitations in the Van Vleck paramagnet TmES in high magnetic fields

Tayurskiĭ D., Tagirov M.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

A model is proposed for explaining the anomalous behavior of the far-IR absorption spectra of the dielectric Van Vleck paramagnet thulium ethyl sulfate TmES. The good agreement obtained between the calculations and experiment on the basis of the idea of a resonance interaction between Tm³⁺ ions in one of the excited doublet states and optical phonons gives grounds for asserting that coupled 4f-electron-phonon excitations exist in TmES single crystals in high magnetic fields at liquid-helium temperatures. © 1998 American Institute of Physics.

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