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## High-frequency electron paramagnetic resonance of $Tm^{3+}$ ions in lanthanum and thulium ethylsulphate single crystals

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### Abstract

We have observed electron paramagnetic resonance and far-infrared absorption of the transitions between the singlet ground state and the first excited doublet of the Van Vleck paramagnetic  $Tm^{3+}$  ion in ethylsulphate crystals in fields up to 10.5 T. The interaction of the Stark levels with a phonon state is clearly shown. The EPR of  $Tm^{3+}$  in the 1000-1600 GHz range are single Lorentzians in lanthanum ethylsulphate but are asymmetric and richly structured in thulium ethylsulphate. This work illustrates the usefulness of high-frequency EPR in the study of Van Vleck paramagnets, which are inaccessible by EPR at conventional frequencies.

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