DE HAAS–VAN ALPHEN EFFECT IN *RE*Ga$_3$ COMPOUNDS

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9.7 cm

The electronic structure and cyclotron masses of $TmGa_3$, $ErGa_3$ and $LuGa_3$ compounds are evaluated by means of the de Haas–van Alphen effect study in strong enough magnetic fields, where magnetization is almost saturated. Also, the pressure effect on dHvA oscillations has been examined in $ErGa_3$ and $LuGa_3$. Concurrently, *ab initio* calculations of the volume–dependent band structures have been carried out for these compounds, including ferromagnetic configuration phases of $TmGa_3$ and $ErGa_3$, in an external magnetic field by employing relativistic versions of the LMTO method with the Zeeman term included. The mass enhancement factors λ were evaluated based on observed (m_c^*) and calculated (m_c^b) cyclotron masses. The estimated magnetic contributions to λ in $ErGa_3$ and $TmGa_3$ appeared to be large and magnetic field dependent. A surprisingly large and intriguing pressure effect on cyclotron masses has been observed in $ErGa_3$. As a whole, the calculated pressure derivatives of the dHvA frequencies appeared to be in agreement with the experimental ones, though a nature of some discrepancies is not clear. A discussion is given on the role of different interactions (CEF, exchange splitting, magnetic–quadrupolar excitations, spin waves) in the effects revealed for *RE*Ga$_3$.

13.4 cm

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