Discharge through a flame is also of practical interest for intensification of chemical reactions in flames and increasing the effect of flames on materials and minerals, and also for physics of atmospheric phenomena, such as the discharge of lightning through a flame, through a jet engine, through fire from tubes or from explosions, for the production of flame electrodes, contact to carry large currents, etc.

In conclusion, the authors thank V. P. Solov'ev, B. P. Shurukhin, and A. V. Chirkov for help in creating the installation.

[1] Exploding Wires, ed. by W. G. Chase and H. K. Moore, vol. 1, Plenum Press, 1959.
[2] Op. Cit. [1], vol. 2, Plenum Press, 1962.

MAGNETIC RESONANCE IN $RbNiF_3$ SINGLE CRYSTALS

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The magnetic properties of single-crystal $RbNiF_3$ were investigated by Smolenskii et al. [1]. We present here results of measurements of electron magnetic resonance in these crystals below the point of transition into the magnetically-rodered state (145°K).

The measurements were made in the frequency range 7.7 - 43.2 Gcs at 77°K in constant and pulsed magnetic fields. The samples were spheres of 0.5 - 0.9 mm diameter.

The magnetic structure of $RbNiF_3$ has not yet been fully explained. However, our results are in agreement with the simple model of a uniaxial ferromagnet with negative anisotropy. For this model the frequency of homogeneous resonance (with account of the first anisotropy constant only) is given by

$$\frac{\omega}{\gamma} = \{[H\cos(\theta_H - \theta_M) + H_A\cos 2\theta_M][H\cos(\theta_M - \theta_H) + H_A\cos^2\theta_M]\}^{\frac{1}{2}} \quad (1)$$

under the condition

$$H_A \sin 2\theta_M = 2H\sin(\theta_M - \theta_H). \quad (2)$$

Here θ_H is the angle between the external magnetic field $\vec{H}$ and the crystal axis, θ_M is the angle between the equilibrium magnetization $\vec{M}_0$ and the crystal axis, and

$$H_A = 2K_1/M_0 \qquad (K_1 < 0).$$

Figure 1 shows the measured dependence of the resonance frequency on the field, and also a plot of $\omega(H)$ calculated from formulas (1) and (2) with $\theta_H = 90°$ (continuous line). The parameters H_A and $\gamma = ge/2mc$ were chosen such as to ensure best agreement between the curve and the experimental points: $g = 2.07$, $H_A = 20.5$ kOe. As seen from Fig. 1, a difference between experiment and calculation occurs only in the region of small fields and may be connected with the presence of a domain structure.

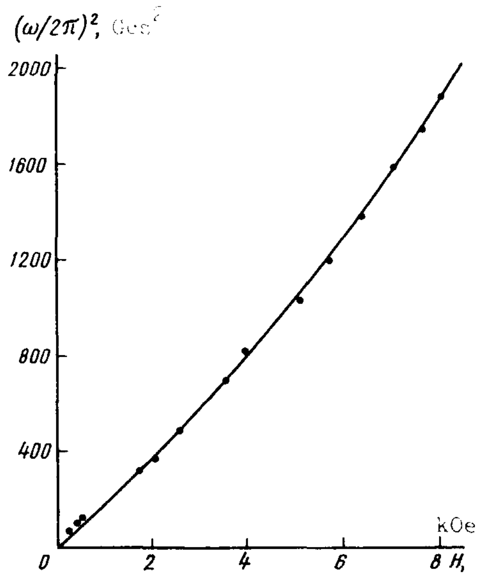

Fig. 1. Dependence of the resonance frequency on the magnetic field at 77°K.

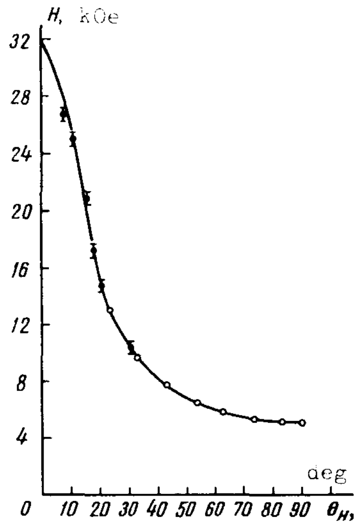

Fig. 2. Dependence of the resonance field on the angle between the field and the [0001] axis. Temperature 77°K, frequency 32 Gsc. Circles - in constant magnetic field, points - in pulsed field.

Figure 2 shows the measured dependence of the resonance field on the angle θ_H (for constant ω) and the results of calculation be means of formulas (1) and (2) for the values of g and H_A give above (solid lines). We see from this figure that the experimental and angular dependence of the resonance field is in good agreement with calculation for the assumed model.

An attempt has been made to measure the anisotropy in the basal plane. However, it did not exceed ~10 Oe.

The width of the resonance curve was dependent on the frequency and on the angle θ_H. The minimum width was observed at higher frequencies at $\theta_H = 90°$ and amounted to $2\Delta H \cong 20$ Oe.

Thus, the foregoing results of the resonance measurements in $RbNiF_3$ single crystals can be explained with the aid of the model of a ferromagnet with "easy plane" anisotropy. However, it is obvious from the value of the magnetic moment [1] of this crystal that it is an uncompensated antiferromagnet. We consider it interesting that ferromagnetic ordering is realized in this substance in the presence of magnetic Ni^{+2} ions only.

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[1] G. A. Smolenskii, V. M. Yudin, P. P. Syrnikov, and A. B. Sherman, this issue p. 271.