pretation of the band at 4μ, and there seems to be no reason why it should not be interpreted as $\nu_3+\nu_4$. An examination of the behavior of this band at low temperatures would perhaps be the best method of checking its assignment as a sum, rather than a difference, of two fundamentals.

The writer wishes to acknowledge the benefit of discussing this matter with Professor Barker.

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Magnetic Anisotropy of Nickel at 20°K

The only experiments on ferromagnetic anisotropy that have been carried out below the temperature of liquid nitrogen are those of Honda, Masumoto and Shirakawa[1] on nickel in liquid hydrogen. Their results indicate a large increase in the anisotropy as the temperature is lowered from 77° to 20°K, the constant K_1 changing by a factor of about 5. On the other hand, Brukhatov and Kirensky[2] have found that in the temperature range from 77° to 350°K, the constant is given by the relation

$$K_1 = K_0 e^{-aT^2} \qquad (1)$$

which predicts an increase of but 20 percent in going from 77° to 20°K. Accordingly we have undertaken, with the kind cooperation of Drs. H. A. Boorse and S. L. Quimby of Columbia University, to measure again the anisotropy constants at 77° and 20°K, using this time the more accurate method of torques.

The ratio of the constants was found to be about 1.2 (accuracy about 10 percent), as compared with the ratio 5 derived from the data of Honda, Masumoto and Shirakawa and 1.21 from the equation of Brukhatov and Kirensky. Our absolute values at 77°K and above are very close to those of Brukhatov and Kirensky. Thus our work extends the validity of this equation to lower temperatures (see Fig. 1) and shows that there is no unusual behavior in the ferromagnetic anisotropy at these low temperatures. This clarifies the theoretical situation since Van Vleck[3] in his discussion of the wave-mechanical theory of anisotropy, has not been able to find any basis for a difference in variation with temperature of the constants for iron and for nickel.

The crystal of nickel used was grown[4] in pure hydrogen from high purity nickel kindly supplied by Mr. E. Wise of the International Nickel Company. It was cut in the form of a disk with planes parallel to (100) and edges rounded to a semi-circle. The thickness was 0.29 cm, the largest diameter 1.38 cm. The liquid hydrogen was introduced into the Dewar flask surrounding the crystal through a straight Dewar tube of stainless steel connected directly to the bottom of the liquefier. The flask and crystal and torsion-measuring apparatus[5] were then removed to the electromagnet for measurement of the torque when the field was inclined at various angles to [011], the direction of easiest magnetization in the (100) plane. The highest field used was about 4000 oersteds. This was not sufficient

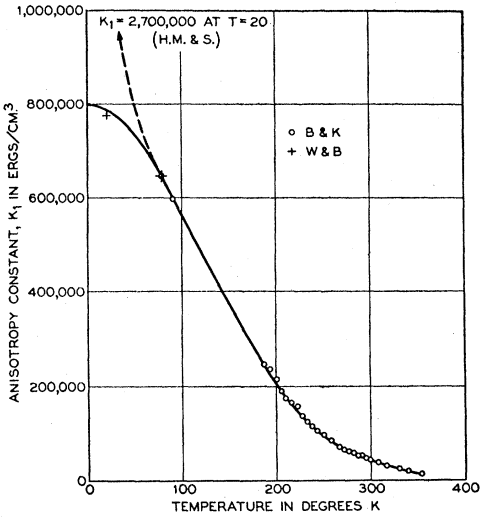

FIG. 1. Anisotropy constant of nickel as dependent on temperature. Data from 77° to 350°K, inclusive, by Brukhatov and Kirensky. Data at 77° and 20°K by the authors, adjusted slightly to fit the former data at 77°K. Curve calculated from Eq. (1) using $K=800{,}000$, $a=0.000034$.

to permit observation of the torque at saturation, but was so near this point that the ratio of the constants at 77° and 20°K could be determined with some accuracy. Saturation was later observed at 77°K in a field of about 5000 oersteds.

We wish to express our appreciation to Dr. Boorse and Dr. Quimby and others of the Cryogenic Laboratory of Columbia University, for supplying the liquid hydrogen.

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[1] K. Honda, H. Masumoto and Y. Shirakawa, Sci. Rep. Tohoku Imp. Univ. **24**, 391 (1935). The anisotropy constant was derived by one of us (R. M. B., J. App. Phys. **8**, 575 (1937)) from their magnetization curves for the [100] and [110] directions. A similar calculation by L. W. McKeehan (Phys. Rev. **52**, 18 (1937)) yielded an even higher value of K_1. Its value is somewhat uncertain on account of the extrapolation of the magnetization curves to saturation.
[2] N. L. Brukhatov and L. V. Kirensky, Soviet Phys. **12**, 602 (1937).
[3] J. H. Van Vleck, Phys. Rev. **52**, 1178 (1937).
[4] By Mr. O. L. Boothby, using the method described by P. P. Cioffi and O. L. Boothby, Phys. Rev. **55**, 673 (1939).
[5] Similar in design to that described by H. J. Williams, Rev. Sci. Inst. **8**, 56 (1937).

The Disintegration of Mesotrons

In order to test the hypothesis of the spontaneous decay of mesotrons we have compared the absorption of the mesotron component of cosmic radiation in air and in carbon.

The mesotrons were detected by the coincidences of three Geiger-Müller tubes arranged in a vertical plane. The counters were shielded with 10 cm of lead on each side to prevent coincidences from the air showers. Also, 12.7 cm of lead was placed between the counters in order to cut off the soft component.

The absorption in air was measured by counting coincidences at different heights from Chicago up to the top of Mt. Evans, Colorado, (4300 m). The absorption in carbon