ponding critical field is $H_{cr}/P = 3$ kOe/mm Hg. The experimentally obtained value was $H_{cr}/P = 4$ kOe/mm Hg. In this case $x \sim 1$, i.e., $K_z \sim \chi(\Omega_e\tau_e)^{-1} \ll \chi$. In other words, the longitudinal wavelength of the disturbance is much larger than the tube radius.

Thus, the described instability of a plasma which is not uniform along the magentic field agrees well with the experimental data on the diffusion in a sufficiently broad range of experiments.

The author is sincerely grateful to B. B. Kadomtsev for stimulating discussions and useful criticism. The author is also grateful to A. V. Nedospasov, V. D. Rusanov, and D. A. Frank-Kamenetskii for valuable discussions.

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MAGNETIC STRUCTURE OF THE COMPOUND FeGe

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Submitted 25 August 1965

The iron-germanium system has not been thoroughly investigated. It suffices to state that only recently have new compounds of this system become known. This includes the compound FeGe [1].

It is already known [2] that the iron-germanium compounds containing more than 50 at.% iron are ferromagnetic, and the only compound with a smaller iron content, $FeGe_2$, is antiferromagnetic. The published data on the magnetic properties of FeGe are contradictory. In [1], on the basis of measurements of the magnetic susceptibility χ, it is suggested that this compound is an antiferromagnet with a Neel point at 410°K. In a later paper by the same authors [2], however, it is regarded as paramagnetic at room temperature (the authors of [2] refer in this case to unpublished results of neutron-diffraction studies of FeGe).

The question of existence of magnetic order in the FeGe compound can apparently be resolved with the aid of the Mossbauer effect, since the iron isotope Fe^{57} is very convenient for these purposes.

We have investigated the Mossbauer spectra of Fe^{57} nuclei in the compound FeGe, in the interval from 77 to 500°K. The investigated sample was prepared by a procedure described in [1]. The initial components were Armco iron and germanium. X-ray structure analysis has established that the sample produced contains a phase with hexagonal structure, having parameters $a = 5.005$ Å and $c = 4.054$ Å. Such a structure is possessed by the compound FeGe [1]. Investigations of the magnetization of the sample in the interval 300 - 500°K have shown that there are no ferromagnetic impurities with Curie points above room temperature.

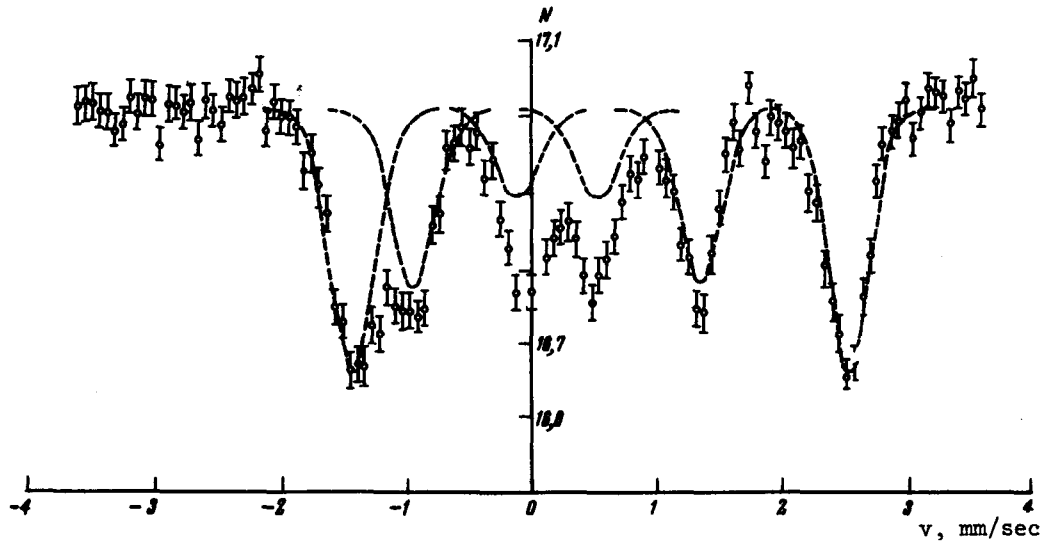

Fig. 1. Absorption spectrum of 14.4-MeV γ quanta.

In experiments on the Mossbauer effect, the FeGe sample was used as an absorber. The source of radiation was Co^{57} introduced in stainless steel.

Figure 1 shows the Mossbauer spectrum of the Fe^{57} in the investigated compound, obtained at room temperature (N - counting rate of the γ quanta in arbitrary units, v - velocity of the radiation source relative to the absorber). The absorber thickness was 4.2 mg/cm^2. The dashed line corresponds to a spectrum calculated under the assumption that the line shape is Gaussian with hyperfine structure component intensity 3:2:1:1:2:3. The presence of all six resolved components of the hyperfine structure in this spectrum offers evidence of the magnetic splitting of the ground and excited levels of Fe^{57}. It follows directly therefore that the compound FeGe has an ordered magnetic structure at room temperature. The magnitude of the local magnetic field acting on the iron nuclei is in this case 123 ± 3 kOe.

The asymmetry of the spectrum is due to the interaction between the nucleus and the inhomogeneous magnetic field. The position of the components relative to the center of gravity of the spectrum corresponds to a quadrupole splitting $\Delta = 3.33 \pm 0.01$ mm/sec (the absorption spectrum is shifted relative to the emission line of the source towards higher energies by an amount $\delta = 0.39 \pm 0.01$ mm/sec).

Comparison of the spectral-component intensities indicates that the investigated sample contains an admixture of a second phase besides FeGe. According to our data, this phase is paramagnetic in the entire investigated temperature interval and corresponds to none of the known phases of the iron-germanium system.

Analogous spectra were obtained also for other temperatures. Figure 2 shows the temperature dependence of the local field H_n. Comparison of the plots of $H_n(T)$ and $\chi(T)$ [1] allows us to state that the compound FeGe is antiferromagnetic.

Extrapolating the $H_n(T)$ plot to $H_n = 0$ would make it possible to determine the Neel

point T_N of this compound. We can use here the fact that $H_n^2(T)$ follows a simple linear law near the magnetic-transformation temperature (Fig. 2b). The Neel point of the compound FeGe can be determined by extrapolating the $H_n^2(T)$ plot to zero field. This yields $T_n = 411 \pm 2°K$.

Assuming that H_n is proportional to the magnetization σ_s of the lattice of the antiferromagnet, this means that the $\sigma_s^2(T)$ is also linear near the Neel point, as predicted by the thermodynamic theory developed for antiferromagnets [3].

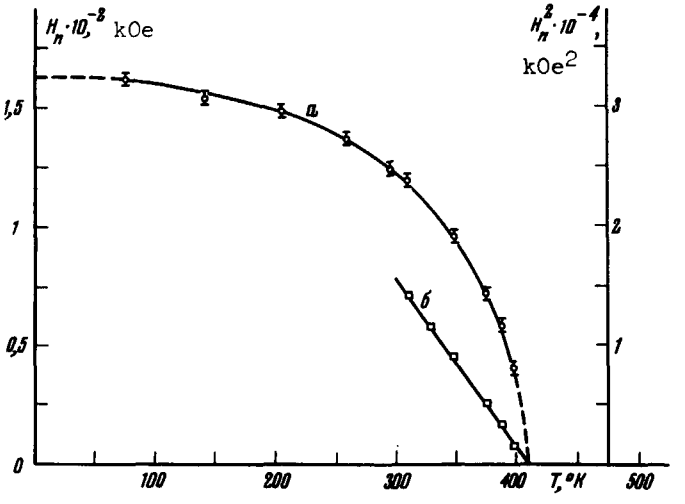

Fig. 2. a - Temperature dependence of the local field H_n acting on the iron nuclei in the crystal lattice of the compound FeGe; b - plot of $H_n^2(T)$.

We note that the relation $H_n^2 \sim (\theta - T)$ (θ - temperature of the magnetic transformation) is apparently a general characteristic of substances with ordered magnetic structures - ferromagnets, antiferromagnets, and ferrimagnets [4].

We take this occasion to thank I. K. Kikoin for continuous interest in the work and Yu. M. Kagan for useful discussions. We are grateful to N. N. Kuznetsov and V. I. Bogachev for help in adjusting the experimental setup, and to P. N. Petrov and V. A. Somenkov for the x-ray structure analysis of the sample.

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ERRATA

In article by V. I. Nikolaev et al. "Magnetic Structure of the Compound FeGe", Vol. 2, No. 8, p. 236 (Russ. p. 375), line 11 from bottom reads: $\Delta = 3.33 + 0.01$ mm/sec, should read: $\Delta = 0.33 \pm 0.01$ mm/sec.