parameter a = 3.31 Å, also an intense diffuse maximum in the interval of 2θ from 20 to 40°. In the second (b) and third (c), the intensity of the diffuse peak drops considerably. The coherent peaks remain unchanged and their relative intensities agree well with those calculated for a model in which a statistical arrangement of the deuterium atoms over the tetrahedral voids is assumed. A repeated analysis of the composition of the samples with respect to deuterium has shown that its concentration remained the same as before.

The diffuse reflection cannot be interpreted as a result of scattering of neutrons by inhomogeneities of the distribution of the metallic atoms, since the x-ray diffraction patterns show neither diffuse nor superstructure reflections. Consequently, it is the result of scattering by the fluctuations of the distribution of the deuterium atoms. This is confirmed also by the decrease of the intensity of the diffuse peak with increasing temperature, which can be readily explained as being due to equalization of the concentration of the deuterium atoms. Such an equalization is natural because of the increase of the mobility of the deuterium, which according to the NMR data, increases noticeably even at slight temperature rises [3].

Thus, the results allow us to draw the following conclusions: a) the light atoms in $(Nb_{0.33}Ti_{0.66})D_{0.33}$ are distributed over the tetrahedral voids of the metallic matrix, b) the distribution of the deuterium deviates from the uniform-statistical one, forming concentration waves.

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ANTIFERROMAGNETIC RESONANCE AND PHASE TRANSITION IN COBALT FLUORIDE IN A PERPENDICULAR MAGNETIC FIELD

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As shown in [1], the symmetry of antiferromagnetic cobalt fluoride (space group D_{4h}^{14}, $T_N = 37.7°K$) admits of the following expansion of the free energy:

$$\Phi = \frac{B}{2} m^2 + \frac{a}{2} (\ell_x^2 + \ell_y^2) + e(m_x \ell_y + m_y \ell_x) - mH,$$

where $\vec{\ell} = \vec{M}_1 - \vec{M}_2$, $\vec{m} = \vec{M}_1 + \vec{M}_2$; $\vec{M}_1$ and $\vec{M}_2$ are the magnetizations of the sublattices.

The presence in the Hamiltonian of the term $e(m_x \ell_y + m_y \ell_x)$ causes a spontaneous magnetic moment directed perpendicular to the z axis to appear when the antiferromagnetism vector ℓ is inclined to the z axis, and antiferromagnets in which the indicated situation is realized without an external magnetic field are called antiferromagnets with weak ferromagnetism [2]. Since in the absence of an external magnetic field the magnetic moments in CoF_2 are directed along the z axis, it does not have a weak ferromagnetic moment. When a field $\vec{H} \parallel [100]$ is applied, the vector $\vec{\ell}$ is deflected from the z axis and forms a
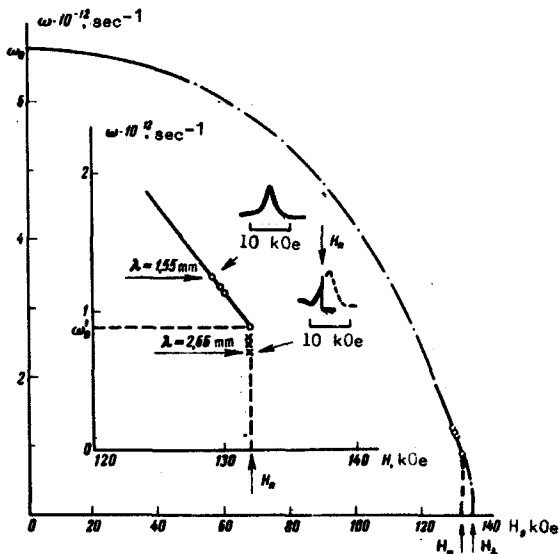
Antiferromagnetic resonance in CoF₂. The solid curve in weak fields - data of [7] at H⃗ ∥ [110], o, × - results of present investigation.

field-induced state with weak ferromagnetism [3, 4]. As was shown theoretically in [5, 6] and observed experimentally in hematite (α-Fe_2O_3) [6], the inclination of the vector $\vec{\ell}$ is accompanied by a decrease of the energy gap in one of the branches of the antiferromagnetic resonance (AFMR).

Since the internal exchange in anisotropy fields are large, the AFMR in CoF_2 in the absence of a magnetic field lies in the far infrared region. An investigation of AFMR in the indicated region was carried out by Richards in relatively weak magnetic fields [7].

We have investigated AFMR in CoF_2 at $\vec{H}$ ∥ [100]. The measurements were performed in pulsed magnetic fields with a pulse duration 3 msec. We used a direct-amplification spectrometer operating in the wavelength range from 4 to 1.5 mm. To prevent eddy currents, dielectric waveguides were used in the region of the magnetic field. To register the absorption signal, we used an oscilloscope having a sweep linearity not worse than 1% over the entire screen (9 × 9 cm). The absorption signal was fed to the vertical plates of the oscilloscope. A voltage obtained by integrating the signal from a test coil located at the location of the sample, directly proportional to the magnetic field, was applied to the horizontal plates. The integration accuracy was not worse than 0.2%. The sweep calibration was against EPR in diphenylpicryhydrazyl (DPPH). The EPR markers in DPPH, observed on the oscilloscope screen for increasing and decreasing field, coincided. The absolute matching with respect to the field was not worse than 3%, and the relative placement and shift of the absorption lines was measured with accuracy to 1%. The indicated accuracy was ensured by the necessary amplitude, frequency, and phase characteristics of the amplifiers. The CoF_2 sample had the form of a plate with dimensions 2 × 3 × 0.8 mm.[1]) The accuracy of sample orientation was not worse than ±3°. The irradiation wavelength was measured with a Fabry-Perot interferometer accurate to 0.5%.

At wavelengths from 1.5 to 2.2 mm, we observed absorption lines of width 2.5 kOe (the figure shows the resonant-absorption line at the wavelength λ = 1.55 mm; the width of the line contour corresponds to the thickness of the trace on the oscilloscope screen). In the indicated range, we observed a monotonic increase of the resonant field with decreasing frequency. However, when a certain critical field H was reached, sharp cutoff of the resonant absorption line was observed on the side of the larger fields (see the figure). The value of the field at which this phenomenon took place did not depend on the wavelength at $\lambda \geq 2.2$ mm, and equaled 132 ± 4 kOe.

The observed cutoff of the AFMR line is apparently analogous to the "premature" vanishing of the resonant absorption line previously observed in

α-Fe_2O_3 [8, 9], which is connected with the jump of the vector $\vec{\ell}$ in the (001) plane.

The experimentally obtained value of the gap at the phase transition point is $\omega_0 = 0.88 \times 10^{12}$ sec^{-2}. Extrapolation of our results to $\omega = 0$ yields $H_\perp = 134 \pm 4$ kOe. Using this value of $H_\perp$ and the values of $H_E = 2M_0B = 770$ kOe and $H_D = 2M_0e = 241$ kOe (M_0 is the magnetic moment of 1 cm^3 of the sublattice), taken from the plots of [4], we can calculate the anisotropy field $H_A = 2M_0a = 123$ kOe, which is in good agreement with the value obtained using the $m(H)|_{H\to 0}$ dependence given in the cited paper. Knowing H_E, H_A, and H_D we can calculate ω_0. The results agree with the value of ω_0 of [7] if the g factor for the given branch of the AFMR is chosen equal to 4. The same value, g = 4, was obtained in the study of AFMR in $CoCO_3$ [10].

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GENERATION OF NEUTRONS IN A LASER CD_2 PLASMA HEATED BY PULSES OF NANOSECOND DURATION

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1. Neutrons resulting from laser heating of a plasma containing deuterium ions were registered to date both in the case of picosecond [1, 2] and nanosecond [3] pulses. These experiments differ both in the heating regimes (the heat conduction and gasdynamic regimes) and in the chemical composition of the target.

In this paper we report registration of neutrons following heating of the plasma by a pulse of laser radiation with parameters close to those of [3], but unlike in the cited investigation, the target was deuterated polyethylene $(CD_2)_n$. The presence of heavy ions in the deuterium plasma should lead, according to [4], to an increase of the temperature and to a decrease of the