gyromagnetic ratio of the atoms in the ground state, and H_1 is the amplitude of the rf field. The function S_1 is similar in shape to the inverted absorption curve, and S_2 is similar to the square of the dispersion curve.

The figure shows the following experimental results: a - appearance of ellipticity in the polarization of the transverse light beam when the orienting resonant radiation I_z is turned on; b - dependence of the degree of ellipticity on $\Delta\omega$ on going through magnetic resonance at $\psi = \pi/4$, and c - the same depndence when $\psi = 0$ and $\pi/2$. The agreement between the experiment and theory is satisfactory.

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NUCLEAR MAGNETIC RESONANCE ON PROTONS IN SOME PARAMAGNETIC SALTS

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Nuclear magnetic resonance (NMR) can be observed in a paramagnet if the line broadening due to the interaction with the electron spins is small. According to [12],

$$\Delta_\omega = \frac{(\gamma_1 H_{loc})^2}{\omega_{exc}}.$$

Resonance was therefore observed either in magnetically-dilute salts, when H_{loc} is small [4], or in salts with large exchange interaction (large ω_{exc}) [1-3,5].

There exist, however, a number of salts in which NMR can be observed. These are the salts customarily used for adiabatic demagnetization - alums, Tutton's salts, and double nitrates [6]. In spite of the fact that ω_{exc} is small, the distance from the paramagnetic center to the protons is relatively large ($r \approx 4 - 6$ Å), and $H_{loc} \sim r^{-3}$ is small.

The theory of NMR in paramagnets is given in [7]. According to [7], the line width $\Delta\omega$ depends on the field and should vary strongly when

$$\omega_e = \gamma_e H_0 \approx \sqrt{2}\omega_{exc}.$$

There are no published data on NMR in paramagnets in this region; this is dealt with in the present paper.

We observed resonance in potassium chrome alum and ferric ammonium alum, and also in cupric-ammonium and manganese-ammonium sulfates. The samples were ellipsoids cut from single crystals in the manner described in [9]. A Pound-Knight pickup was used [8].

We obtained the following results:

1. In fields 1 - 3 kG all the investigated salts, except cupric-ammonium sulfate have large paramagnetic absorption, exceeding the nuclear absorption by three orders. However,

since the EPR absorption width is larger by three orders than that of NMR, the derivatives are commensurate and this makes it possible to observe the NMR against the background of paramagnetic absorption.

2.At temperatures 10 - 20°K all salts give a single unshifted resonance line of width $\Delta H \approx 20$ G, independent of the field in the 1.1 - 2.8 kG range.

3.At temperatures 1.5 - 4.2°K, the NMR line is split. The maximum shift depends on the orien

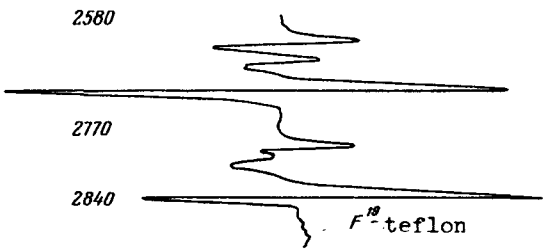

Fig.1. Derivative of NMR absorption in cupric ammonium sulfate. H_0 in the [111] plane is 11.3 MHz. T = 1.5°.

orientation. The maximum shift at T = 1.5°K is about 200 G for ferric ammonium alum (H_0 = 2.2 kG) and 100 G for cupric ammonium sulfate (H_0 = 2.7 kG).

To estimate the shift and the line widths we used the simple formulas [12]

$$\bar{H}_{loc} = H_{loc}\frac{\mu H_0}{kT}, \quad \Delta_\omega = \frac{(\gamma_1 H_{loc})^2}{\omega_{exc}}.$$

The structure of the alums is described in [10] and that of Tutton's salts in [11]. The calculated values of the shifts of H_{loc} and of the magnetic contribution to the width are listed in the table. The number 1 denotes the water belonging to the magnetic ion, 2 to the nonmagnetic one, and 3 stands for protons from NH_4^+.

It can be concluded that we have observed resonance on the protons of the water of the non-

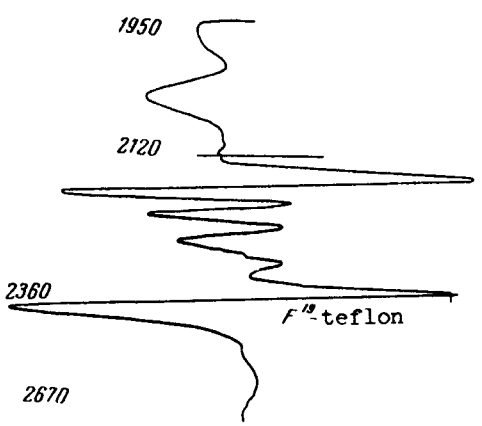

Fig.2. Derivative of NMR absorption in ferric ammonium alum. H_0 in [111] plane = 9.226 MHz. T = 1.5°.

	Cr^{3+}		Fe^{3+}			Mn^{2+}		Cu^{2+}	
	1	2	1	2	3	1	3	1	3
r, Å	2.6	4.01	2.6	4.01	6.15	2.7	3.9	2.7	3.9
H_{loc}, Oe	2020	559	3100	850	240	2800	930	900	300
H_{loc}	1000	280	1800	490	130	1100	290	210	70
H_{exp}		-250*		+150	-100		+205; -200	+80	-110
ΔH, Oe	60	4.3	50	4.0		5.5	0.6	7.4	0.9

magnetic ion and the ammonium protons in the alums, and resonance on the ammonium protons in Tutton's salts. Since the measured line width coincides with the width in magnetically dilute salts, the paramagnetic contribution is small. We were unable to observe resonance on the protons of the magnetic-ion water. The width of these lines apparently exceeds 100 Oe.

In conclusion, it is my pleasant duty to thank N. E. Alekseevskii for directing the work.

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* The sign (-) denotes that the local field is directed opposite to H.

COHERENT EMISSION OF InP OPTICALLY EXCITED BY AN INJECTION LASER

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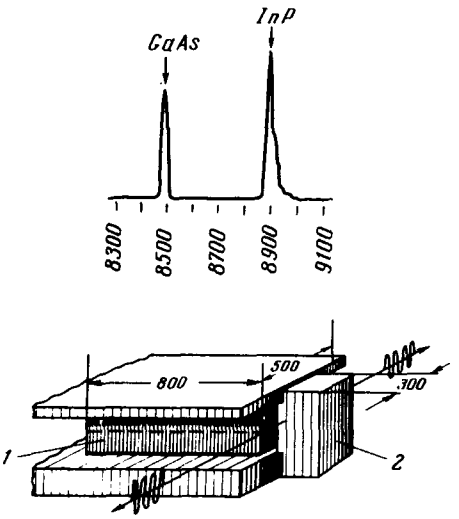
Optical excitation of light generation in semiconductors has already been reported in a number of papers [1-5]. We have obtained for the first time coherent emission in optically-excited indium phosphide. The exciting-radiation source was a GaAs injection laser of the diffusion type. The experiments were made at 77°K.

The injection laser measured 500 x 800 x 200 μ and had a threshold current 8 A. Its coherent-emission wavelength was bout 8500 Å. The diode gave a total light yield of 24 W at a pulsed current of 70 A.

The excited InP sample had a resonator of the Fabry-Perot type with a distance 300 μ between mirrors. The third face of the sample was optically polished strictly perpendicular to the resonator mirrors, and this face of the sample faced the mirror of the injection diode, as shown in the figure. The distance between the diode and the sample was several microns.



Below - arrangement of diode 1 and excited InP sample 2 in experiment on optical excitation of stimulated emission. The dimensions are in microns. The direction of the InP stimulated emission is indicated by the arrows. Above - summary spectrum of the emission in the directions of the arrows of the lower figure.