* The stationary solutions for this case have been investigated previously[3], starting from the diffusion equation. It is easily shown that the solution in our case has the same form.

[1] M. V. Koniukov and Ia. P. Terletskii, J. Exper. Theoret. Phys. USSR **27**, 542 (1954)

[2] H. Krefft. Phys. Z. 32, 948 (931); H. Krefft, H. Reger and R. Rompe, Z. techn. Phys. **14**, 242 (1931)

[3] R. Seeliger and A. Kruschke, Phys. Z. **34**, 883 (1933)

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Polarization of the Nuclei of Ferromagnetic Atoms

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DURING the past years several indirect methods have been proposed for obtaining oriented nuclei (see references 1,2). Still another method of obtaining polarized nuclei is proposed in the present note.

It is possible to polarize nuclei of ferromagnetic atoms in the following manner. Ferromagnetics which contain nuclei possessing spins are cooled to very low temperatures (for this purpose it is necessary to bring the ferromagnetic into thermal contact with a cooled paramagnetic salt). An external magnetic field exceeding the saturation field is then superimposed on the ferromagnetic. Complete polarization of the shell spins is then obtained.

In turn this brings about a significant polarization of the nuclei (owing to the great magnitude of the field, forming a shell on the nuclei, and also due to the very low temperature) The relaxation of the nuclear spins will be rapid since it is tied in with the interaction of nuclei with the conduction electrons.

The advantage of the ferromagnetic method consists in the fact that by this means a target is obtained free of foreign atoms. The drawback of this method is that it is applicable only for polarization of nuclei of ferromagnetic atoms.

Shchegolev, Alekseevski and Zavaritskii have observed anisotropy in the γ-rays emitted from the nuclei of Co^{60}, when polarized by the ferromagnetic method. At a temperature of the order of 0.05 - 0.08°K intensity, the γ-intensity radiation along the external field is about 10-15% less than in the perpendicular direction.

In conclusion, I wish to express thanks to N. E. Zavaritskii and to I. F. Shchegolev, who reported the results of their measurements.

[1] R. J. Blin-Stoyle, M. A. Grace and H. Halban, Progress in Nuclear Physics 3, 63 Pergamon Press, London (1953).

[2] G. R. Khutsishvili, Uspekhi. Fiz. Nauk 53, 381 (1954)

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The Rotation of the Plane of Polarization in Electrolytic Solutions by a Magnetic Field

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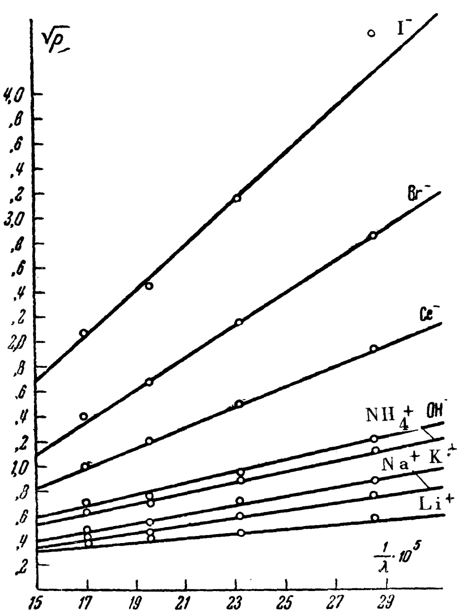
OKAZAKI[1], in a careful study of the Faraday effect, found that in aqueous solutions of strong electrolytes, the effect could be considered as made up of additively of two parts, the so-called molar rotations of the different ions.



Attention is called here to the increase of the molar rotation ρ with frequency ν of the light which is well represented by the simple relations

Cations: $\nu = A' \rho^{1/2}$,

Anions: $\nu = A'' \rho^{1/2} + B$,

A′ and A″ are constants for a given ion which decrease from ion to ion along with their crystal ionic radii.

Figure 1 shows the agreement of the measured values with the above relations. The values of $\sqrt{\rho}$ were calculated from the data of Okazaki[1] and are also given in the table below.

λ	Li^+	Na^+	K^+	NH_4^+	Cl^-	Br^-	I^-	OH^-
5900	0.378	0.412	0.490	0.632	1.000	1.396	2.057	0.655
5100	0.412	0.458	0.574	0.714	1.204	1.670	2.464	0.728
4300	0.458	0.600	0.707	0.877	1.487	2.145	3.162	0.949
3500	0.583	0.775	0.877	1.127	1.949	2.850	4.470	1.225

1 A. Okazaki, Proc. Phys. - Math. Soc. (Japan) 24, 40 (1942); see also J. Parkington, *A Treatise on Physical Chemistry* (London, 1953) Vol. IV p. 604.

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Distribution Function of a Non-ideal Bose Gas at the Temperature of Absolute Zero

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THE distribution function for the momentum molecules of an ideal Bose gas at the temperature of absolute zero has a δ-like character. All the molecules of the gas lie in the lowest energy level with zero momentum. For a non-ideal gas this no longer holds even at absolute zero, owing to the interaction of the molecule with the non zero momentum.

In the work of Bogoliubov and the author[1], the wave function of the lower state of a weakly non-ideal Bose-gas was calculated. In the first approximation it has the form

$$\varphi_0 = \exp\left\{ {}^1/_2 \sum_k (1 - \lambda_k^{-2})\, \rho_k \rho_{-k} \right\}, \tag{1}$$

where

$$\rho_k = \frac{1}{\sqrt{N}} \sum_{j=1}^{N} \exp\{-i\,(k r_j)\}, \tag{2}$$

$$\lambda_k^4 = \frac{\hbar^2 k^2}{V}\left(\frac{N\nu(k)}{4m} + \frac{\hbar^2 k^2}{4m}\right)^{-1}, \tag{3}$$

$\nu(k) = \int \Phi(r) e^{i(kr)} dr$ = Fourier coefficient of energy of interaction $\Phi(r)$, N = number of particles, V = volume of the system, m = mass of the particle.

The function φ_0 corresponds to the zero vibrations of the collective variables ρ_k. By means of this wave function it is possible to find the distribution function for the momentum of molecules of a non-ideal Bose gas. It is possible to show this in the following way. The momentum distribution function permits us to calculate the mean value of operators of the additive type; this depends on the momenta of the particles. If one makes up an arbitrary function of additive type out of the particle momenta:

$$\sum_{j=1}^{N} f(\mathbf{p}_j), \tag{4}$$