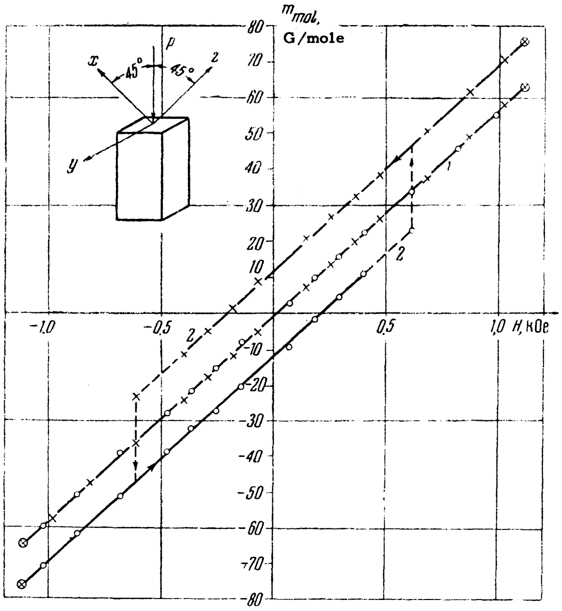

The dependence of molar magnetic moment on the size of the applied field: 1 — without pressure, 2 — pressure on specimen ~ 500 kg/cm²; o — values obtained while changing the field from − 1100 oersteds to + 1100 oersteds × — while changing the field in the opposite direction.

$\chi_\perp$; thus, in agreement with the data of previous studies,[5,6] the crystal does not possess a spontaneous moment* and is in a purely antiferromagnetic state. On applying a pressure of ~ 500 kg/cm² (curve 2), the paramagnetic moment remains unchanged, but a spontaneous piezomagnetic moment is added to it, the magnitude of which, $m_0 \sim 10$ G/mole, does not depend on field. In weak fields (up to 500 oersteds) the direction of the piezomagnetic moment remains unchanged. In large fields of opposite direction to the spontaneous moment, the magnetization of the specimen reverses. The process of magnetization reversal is comparatively slow — in a field of 1100 oersteds the equilibrium values are attained in 15 — 20 minutes.

A piezomagnetic effect was also observed in the MnF_2 specimen. However, its magnitude in MnF_2 is approximately 100 times smaller than in CoF_2.

A fuller description of the experimental details, the results, and their analysis, will be published after completing a study of specimens with other orientations.

In conclusion the author expresses his deep gratitude to Acad. P. L. Kapitza for constant interest in the work. The author is very grateful to N. N. Mikhaĭlov and O. S. Zaĭtsev for preparing the single crystals of CoF_2 and MnF_2. He also cordially thanks I. E. Dzyaloshinskiĭ for useful discussion.

*The small downward displacement of the line (approximately 1 G/mole) is in all probability associated with plastic deformations of the crystal.

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DETERMINATION OF THE CAPTURE FREQUENCY OF SLOW MESONS BY LIGHT AND HEAVY NUCLEI IN PHOTOEMULSIONS

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In many uses of photoemulsions it is necessary to determine how much of the interaction is with the light nuclei (C, N, O) and how much is with the heavy ones (Ag, Br). The presently known separation methods (see, for example, references 1 and 2) are based on the use of special emulsions, and can therefore not always be used. We describe below a simple separation method, free of this shortcoming.

In order to be specific, we discuss only nuclear capture of stopped negative pions. If an Auger electron was produced when the negative pion was stopped, the capture was by the heavy nucleus of the emulsion.[1,3-5] If the σ_π star produced after stopping contains a particle with a range $\leq 50\,\mu$ (so-called sub-barrier particle) the corresponding capture must be attributed to a light nucleus.[1,4,6*]

Let N_H be the number of σ_π stars of the first step, N_L that of the second, and N_N the number of σ_π stars that remain unseparated. We now choose some additional identification, which may be common to σ_π stars of all types, and denote by n_H, n_L, and n_N the number of σ_π stars in each of the three groups having this identification.† We can then write

$$N_N = M_H + M_L, \quad n_N = (n_H / N_H) M_H + (n_L / N_L) M_L,$$

where M_H and M_L is the number of captures by heavy and light nuclei among the stars of group N. Consequently, the total number of captures by heavy nuclei will be

$$N_H + M_H = N_H + \frac{n_N - (n_L / N_L) N_N}{n_H / N_H - n_L / N_L} = N_H + N_N \frac{\alpha_N - \alpha_L}{\alpha_H - \alpha_L},$$

where α_H, α_L, and α_N is the frequency of appearance of the additional selected identification in groups H, L, and N. Analogously, the total number of captures by light nuclei will be

$$N_L + M_L = N_L + N_N (\alpha_N - \alpha_H) / (\alpha_L - \alpha_H).$$

The foregoing method was tested with 349 σ_π stars, taken from reference 3.‡ The σ_π stars were considered to have an additional identification, if they contained more than one black prong ($N_H \geq 2$). The frequency of capture of pions by heavy nuclei was found to be $(63 \pm 2.8)\%$, which is in good agreement with the results obtained by other methods.[1,2,7,8] It was assumed here that prongless stars are formed in 27% of all cases of capture of π^- mesons[9] and that 13.7% of all the σ_π stars produced in the capture of π^- mesons by light nuclei are prongless.[10] By way of one possible application, it would be interesting to estimate by the same method the frequency of capture of slow K mesons by light and heavy emulsion nuclei.

*Both statements are not true, naturally, in all cases. However, the exceptions are very rare and can be disregarded in practice.

†It is assumed that the indicated third identification is statistically independent of the first two.

‡The authors are grateful to S. A. Azimov and U. G. Gulyamov for furnishing the material.

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A CORRECTION TO V. M. STRUTINSKIĬ'S PAPER "EXCITATION OF ROTATIONAL STATES IN ALPHA DECAY OF EVEN-EVEN NUCLEI"

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In the calculation of deformation parameters α of even-even nuclei from the relative intensity of α decay into the state $2^+ (\xi_2)$, inexact experimental data, quoted by the author from Gol'din's survey,[2] were employed in reference 1 in a number of cases. Cited below are the parameters α for these nuclei, obtained on repeated calculation, using experimental data on the fine structure of α decay as cited in references 3 and 4. The values of α were also determined as in reference 1 and with the aid of the same curves (similar to those shown in Fig. 2) as were previously plotted for all even-even nuclei considered in reference 1. The daughter nuclei, $\xi_{2(\exp)}$, and the values of α for $r_0 = 1.4 \times 10^{-13}$ cm. are successively indicated. Negative values of α are given in those instances when they too can be reconciled with the intensity distribution.

Rn^{218} : 0.04 [4], +0.06, −0.10; Th^{230} : 0.39 [3,4], +0.15;
U^{230} : ∼0.33 [4], +0.12;
U^{232} : 0.45 [3], +0.15; 0.39 [4], +0.13;
U^{236} : 0.32 [2,3,4], +0.12; Pu^{240} : 0.30 [3,4], +0.11;
Cm^{246} : 0.20 [3,4], +0.09, −0.16;
Cm^{248} : 0.18 [3,4], +0.09, −0.16;
Cf^{250} : 0.20 [3,4], +0.08, −0.19.