urements at a temperature of 20.4°K (triangles) and of 4.2°K (black points). The basic effect of a decrease in the electrical resistivity is observed in the region of the technical magnetization of the specimen. This can be explained by two circumstances: mainly by an extension of the domain structure in the magnetization process, i.e., by a decrease in the number of boundaries and, apart from that, by a rotation of the magnetic moment of the region in the direction of the external magnetic field.[6]

From the magnitude of the decrease in electrical resistivity of $\sim 30\%$ at helium temperature in a longitudinal magnetic field, and from the theoretical work on the determination of the influence of the specimen size on the electrical resistivity,[7] we can determine the magnitude of the mean free path, $\lambda \sim 10^{-3}$ cm. This value coincides with the estimate of the domain width for the given sample in the demagnetized state.

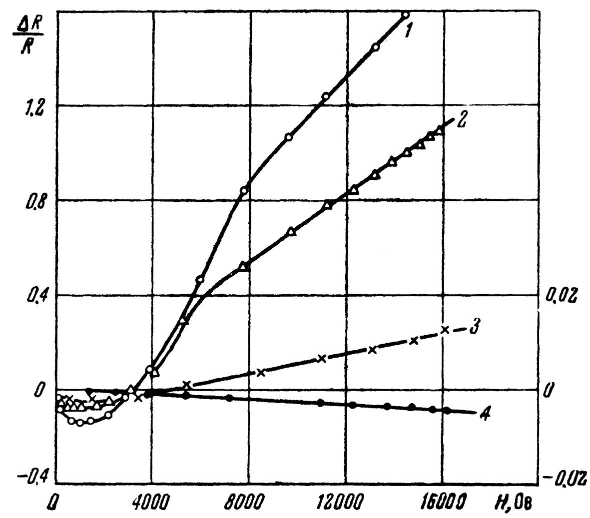

FIG. 2

In a transverse magnetic field (Fig. 2) two effects take place: an extension of the domain structure (decrease of the electrical resistivity in weak fields) and the ordinary galvanomagnetic effect which dominates in high fields.[8] The curves 1, 2, 3, and 4 refer to measurements at temperatures of 4.2, 20.4, 77, and 300°K, respectively. The scale on the right refers to curves 4 and 5 [sic!].

An influence of the measuring current on the magnitude of the electrical resistivity was detected. An increase by 20% in the resistivity was observed when the measuring current increased from 0.1 to 1000 ma. Unfortunately the literature contains no data at all considering domain structure in the field of a current. Apparently, the measuring current leads to a decreased domain structure, since it produces in the sample an inhomogeneity in the magnitude and direction of the magnetic field.

We must still remark that to determine the residual resistivity of a ferromagnet as a criterion for the purity it is necessary to take into account the dependence of the electrical resistivity on the measuring current and the magnetic field. For the specimen under investigation the relative residual resistivity was 4×10^{-3} if the influence of the domain structure was not taken into account and 3×10^{-3} if it was taken into account.

In conclusion the authors express their gratitude to B. G. Lazarev, S. V. Vonsovskii, and M. I. Kaganov for discussing the results and showing an interest in this work.

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ANGULAR CORRELATION OF CIRCULARLY POLARIZED GAMMA QUANTA ON THE μ-MESONIC ATOM

V. A. DZHRBASHIAN

Physics Institute, Academy of Sciences, Armenian S.S.R.

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THE μ-mesonic atom, produced as a result of capture of a polarized μ^- meson on the external orbit, will radiate circularly-polarized gamma quanta. As a consequence of the spin-orbit interaction, which leads to depolarization of the μ^- meson on the orbit, the angular distribution and the angular correlation of these quanta depend on the degree of polarization of the μ^- meson.

Comparison of theory with experiment can yield information on the magnitude of the degree of polarization ($|P|$) and the direction of depolarization (sign of P) of μ^- mesons produced in decay of negative pions.

In the case of lead, according to Wheeler,[1] the energies of the gamma quanta radiated during the cascade transition 2s-2p-1s are respectively equal to 1.33 and 4.42 Mev.*

To obtain the correlation functions it is possible to employ the formula obtained in our preceding work,[3] neglecting the interaction at the first level. It is also necessary to take it into account that for the case of circularly-polarized quanta the formula changes somewhat. A factor† $(-\tau_1)^{\nu_1}(\tau_2)^{\nu_2}$ appears under the summation sign, where ν_1 and ν_2 are the orders of the spherical functions, which (together with the order of the degree of orientation k) can assume also odd values. Inserting the values of the spin of the μ meson ($s = 1/2$) and considering a nucleus of spin $I = 0$, we obtain for the cascade 0(1) 1(1)0

$$W = 1 - \frac{7}{6}\tau_1\tau_2\cos\theta + \frac{4}{9}\tau_2 P\cos\theta_2 + \frac{1}{12}(3\cos^2\theta - 1) \quad (1)$$
$$-\frac{1}{6}\tau_1 P[\cos\theta_1(3\cos^2\theta_2 - 1) + 3\cos\theta_2(\cos\theta - \cos\theta_1\cos\theta_2)]$$
$$-\frac{1}{18}\tau_2 P[\cos\theta_2(3\cos^2\theta_1 - 1) + 3\cos\theta_1(\cos\theta - \cos\theta_1\cos\theta_2)].$$

Here θ_i is the angle between the direction of the i-th quantum ($i = 1, 2$) and that of the incident negative muon, and θ is the angle between the two quanta. A value $P > 0$ corresponds to a predominant spin alignment with the direction of the incident negative muon.

If the direction of the first quantum is assumed the same as that of the incident negative muons, then

$$W = 1 + \left(-\frac{7}{6}\tau_1\tau_2 + \frac{1}{3}\tau_2 P\right)\cos\theta$$
$$-\frac{1}{6}\tau_1 P(3\cos^2\theta - 1) + \frac{1}{12}(3\cos^2\theta - 1). \quad (2)$$

When $\theta = 24°39'$ we have $W_{++} = 0.077(1 + 0.9P)$, along with the ratio

$$(W_{++} - W_{--})/(W_{++} + W_{--}) = 0.9P. \quad (3)$$

Here $W_{++}(W_{--})$ denotes the value of W for $\tau_1 = \tau_2 = 1$ ($\tau_1 = \tau_2 = -1$). When $\theta \to 0$ the multiplier of P in Eq. (3) tends to unity, but at the same time $W \to 0$.

Integrating (1) over $d\Omega_1$ we get the angular distribution for the transition $2p \to 1s$

$$W = 1 + {}^4/_9\tau_2 P\cos\theta_2,$$

i.e.,

$$[W(0°) - W(180°)]/W(90°) = {}^8/_9\tau_2 P. \quad (4)$$

We take this opportunity to express our deep gratitude to V. V. Vladimirskii for the interest displayed, and to K. A. Ter-Martirosian for valuable discussions.

*According to data by Fitch and Rainwater,[2] gamma quanta of energy 6.02 Mev are emitted in the transition $2p \to 1s$.

†$\tau = +1$ ($\tau = -1$) for right-hand (left-hand) circularly polarized gamma quantum.

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BREMSSTRAHLUNG AND PAIR PRODUCTION FROM PROTONS WITH ALLOWANCE FOR FORM FACTOR

I. ZLATEV and P. S. ISAEV

Joint Institute for Nuclear Research

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ACCORDING to the present view, a nucleon consists of a "core" surrounded by a cloud of virtual mesons. The distribution of nucleonic charge and magnetic moment has been studied in detail by Hofstadter in the scattering of high-energy electrons from protons and neutrons. In this connection it is of interest to investigate the influence of the form factor on the related reactions e.g., bremsstrahlung and pair production on nucleons.

We have calculated these processes on protons in the lowest order of perturbation theory (third order in e). Graphs a and b were computed for bremsstrahlung and graphs c and d for pair production. An additional contribution is due to