Photoprotons from A^{40}

A. P. KOMAR AND I. P. IAVOR
Leningrad Physico-Technical Institute
Academy of Sciences, USSR
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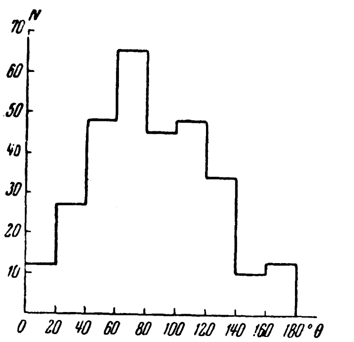
THE angular distribution of photoprotons from A^{40} has been examined. They were obtained by irradiating the A^{40} with the γ-beam from a synchrotron of maximum energy 90 mev.

Photoprotons with energy of 2-10 mev were registered in a Wilson cloud chamber filled with argon at a pressure of 1.4 atmos and mixed with the vapor of ethyl alcohol and water. The Wilson chamber, 30 cm in diameter and 7 cm deep, worked on a compression cycle of period 10-15 sec. The argon in the chamber was irradiated with a collimated γ-beam of diameter 1.6 cm, admitted to the chamber through an aluminum window (100μ) in the side wall. Proton tracks resulting from the (γ, p)-reaction were photographed stereoscopically



Angular distribution of photoprotons from A^{40}. N — number of proton tracks; θ — angle between the γ-beam and direction of ejected proton.

We examined 302 proton tracks. The angles were measured to an accuracy of 1-2% by a reprojection system. The histogram in the Figure was constructed by combining the tracks in 20° intervals. One clearly sees the forward directionality with a maximum at approximately 70°. The shape of the photoproton angular distribution obtained in this work is in satisfactory agreement with that obtained by Spicer[1], using nuclear emulsions and a maximum γ-beam energy of 22.5 mev.

From the character of the angular distribution of the photoprotons it follows that electric dipole absorption is occurring in the argon nuclei. The asymmetry is probably due to a direct photoeffect or quadrupole absorption of γ-rays.

[1] B. M. Spicer, Phys. Rev. 100, 791 (1955).

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The Effect of Uniform Compression upon the Magnetic Properties of Bismuth at Low Temperatures

B. I. VERKIN, I. M. DIMITRENKO AND B. G. LAZAREV
Physico-Technical Institute
Academy of Sciences, Ukrainian SSR
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SEVERAL papers have recently been published dealing with investigations of the influence of uniform compression upon the various properties of metals at low temperatures. Thus, Alekseevskii and his co-workers[1] have studied the effect of uniform compression upon the galvanomagnetic properties of bismuth and its alloys, and Overton and Berlincourt[2] have instituted an investigation into the effect of uniform pressure upon the oscillations of the Hall coefficient and the variation of the magnetoresistance of bismuth in a magnetic field.

In view of the fact that uniform compression of a crystal in all probability alters the structure, the degree of filling, and the possible overlapping of the electronic energy zones which govern the de Haas-van Alphen effect, an experimental study of the effect of uniform compression upon the oscillations of the magnetic susceptibility seems to be called for.

Bismuth was selected as the first subject of such investigation. The required pressures were produced by means of the method previously developed by one of the present authors in conjunction with Kan[3].

A bismuth monocrystal was fixed with a predetermined orientation into a special holder, and was placed within a cylindrical high-pressure bomb of beryllium copper, the latter being prepared in the laboratory from pure copper and beryllium. The bomb was filled with water and