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PARAMAGNETIC RESONANCE OF THE FREE RADICALS OBTAINED BY FREEZING A PLASMA OF H_2S

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HYDROGEN sulfide, generated by the usual method and dried over calcium chloride under a pressure of 0.3 mm Hg, was passed into a quartz tube in which a high frequency electrodeless discharge was excited. The power in the discharge was 120 w and the frequency was 40 Mcs. The discharge tube was joined to a quartz trap cooled by liquid nitrogen. The dissociation products of the H_2S were frozen out on the inner surface of the trap. The electron paramagnetic resonance spectrum was observed for the material condensed below the nitrogen level. The substance had a dark green color and a snow-like structure.

Observations were carried out at 1300 and 9400 Mcs. For observation at 1300 Mcs, the frozen material was placed in a previously cooled through-type quarter-wave coaxial resonator connected to a vacuum pump. The absorption spectrum was observed on the screen of an oscillograph. Observations were made at 77°K. The line observed was 16 ± 1 gauss wide at half intensity and had a nearly Gaussian shape.

The dependence of the absorption line on preliminary warming of the specimen was qualitatively investigated. It was found that keeping the specimen for an hour at 120 to 130°K is not accompanied by an essential change in the intensity and shape of the line. Keeping the specimen at 170°K for an hour causes a several-fold drop in intensity and a narrowing of the line to 12 gauss. A very weak line continued to be observed after 30 min at dry-ice temperature. Let us note that storing the specimen at 77°K for two months did not give rise to a noticeable change of intensity of the line.

Observations at 9400 Mcs were carried out on a superheterodyne spectroscope[1] in a cylindrical resonator in an H_{011} mode. The shape of the line differed radically from Gaussian. The line breadth was 85 ± 5 gauss, and the spectroscopic splitting factor $g \approx 2.03$. On warming the specimen, the peak of the line deformed asymmetrically. The change of shape of the line on warming indicates that the condensed material contains two radicals with different stability to warming.

A comparison of the line breadths at 1300 and 9400 Mcs, as well as the asymmetry of the line at 9400 Mcs, are evidence of a strong anisotropy of broadening ($g_{\parallel} > g_{\perp}$).

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ON THE PROBLEM OF ANGULAR CORRELATION OF SECONDARY PARTICLES PRODUCED IN HIGH-ENERGY NUCLEAR COLLISIONS

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WE report here the results of a study of the correlation between the emission angles of secondary relativistic particles produced in interactions between ~9-Bev protons and emulsion nuclei. The coefficient of correlation between the number of particles emitted within various solid angles was measured for that purpose.

Consider two non-overlapping solid angles Ω_1 and Ω_2, and two random variables n_1 and n_2, equal to the number of secondary relativistic particles in a given star emitted within Ω_1 and Ω_2 respectively. We denote by p_1 and p_2 the emis-