forces, then the thermal energy input to the LiF under these conditions is approximately one-fifth the required value. A similar situation takes place also for NaCl, CsBr, and for other states in LiF.

What is the character of the radiation we are dealing with? Since the measurements are made in the visible region, it can be due only to electrons. It is noteworthy that the light fluxes measured in different sections of the spectrum correspond to nearly equal brightness temperatures (see the table), corresponding in turn to Planck radiation. This indicates that the electrons are in equilibrium with one another. At the same time, they are not in equilibrium with the lattice, since their temperature is much lower than the lattice temperature.

Apparently a similar phenomenon was observed by Brooks [5] in shock compression of crystalline quartz along the x axis. The glow observed by him, which appears simultaneously in the entire section of the sample subjected to the action of the shock wave, was identified by him with electroluminescence due either to breakdown of the dielectric or to ionization of the impurities by the electric field generated by the shock wave.

The extent to which the phenomenon observed by us may be related to electroluminescence is unclear, primarily because electroluminescence is characterized by a clearly pronounced wavelength dependence of the radiation intensity, which was not observed in our case. To be sure, an increase of the lattice temperature can lead to a broadening of the "dome" of the radiation. Although at present there is still no clear picture of the observed phenomenon, it can be proposed that plastic deformation leads to the creation of a large number of free electrons having a high temperature and entering gradually into equilibrium with the lattice. Judging from the growth time of the radiation brightness, this radiation is emitted by thin layers of matter directly adjacent to the density discontinuity on the front of the shock wave. It follows from this that the time of establishment of thermal equilibrium between the electrons and the lattice is $\tau \geq 10^{-7}$ sec.

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CHANGE OF EFFECTIVE MAGNETIC FIELD AT THE Sn^{119} NUCLEUS IN GADOLINIUM GARNET ON GOING THROUGH THE COMPENSATION POINT

I. S. Lyubutin, V. A. Makarov, E. F. Makarov, and V. A. Povitskii
Institute of Crystallography, USSR Academy of Sciences
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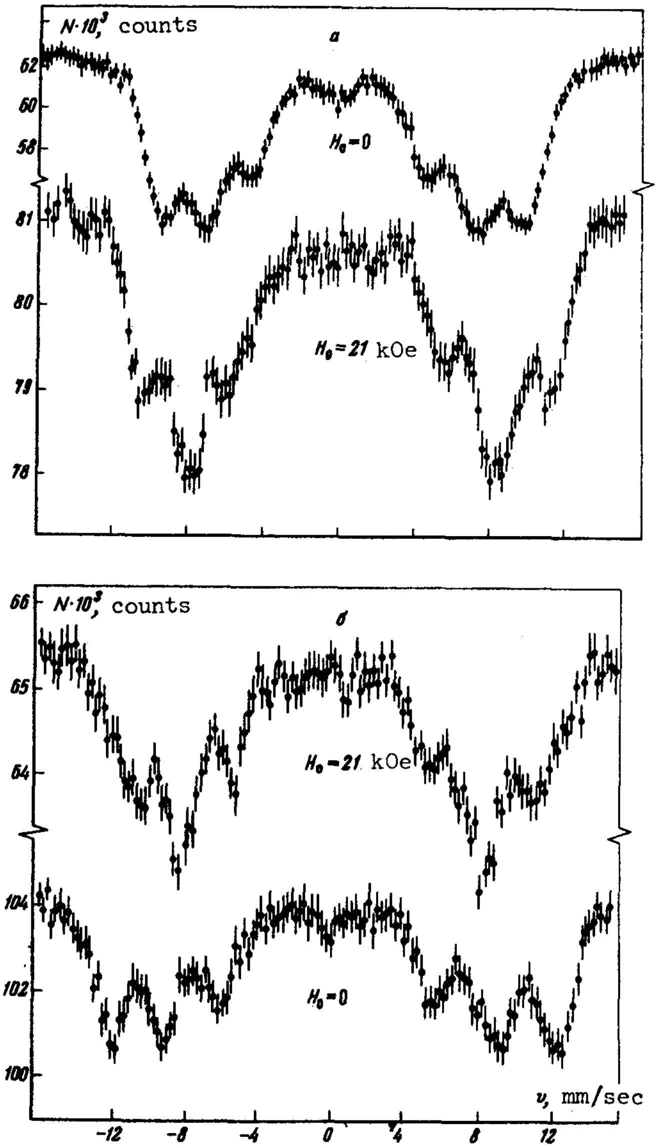
We report here measurement of the sign of the effective magnetic field H_{eff} acting on the nuclei of the tin ions in a substituted gadolinium-iron garnet $Gd_{2.7}Ca_{0.3}Fe_{4.7}Sn_{0.3}O_{12}$ at temperatures above and below the compensation point. It was recently observed [1,2] that



Mossbauer absorption spectra of Sn^{119} nuclei in $Gd_{2.7}Ca_{0.3}Fe_{4.7}Sn_{0.3}O_{12}$ iron garnet in a transverse magnetic field and in the absence of a field: a - at T = 300°K, b - at T = 95°K.

Values of the effective magnetic field at the Sn^{119} nuclei (kOe) in the compound $Gd_{2.7}Ca_{0.3}Fe_{4.7}Sn_{0.3}O_{12}$, measured at temperatures above and below the compensation point in an external magnetic field (H_0 = 21 kOe) and in the absence of a field (H_0 = 0).

T, °K	H_0 = 0	H_0 = 21	Sign of H_{eff}
95	184 ± 2	161 ± 3	negative
300	148 ± 2	167 ± 3	positive

the sign of the field H_{eff} at the Sn^{119} is positive in tin-substituted yttrium iron garnet. It was found earlier [3] that the magnitudes of the fields H_{eff} at the nuclei of the tin ions in gadolinium garnets $Gd_{3-x}Ca_xFe_{5-x}Sn_xO_{12}$ and yttrium garnets $Y_{3-x}Ca_xFe_{5-x}Sn_xO_{12}$ are equal. The presence of a rare-earth sublattice in the garnet does not influence the magnitude of the field H_{eff} at the nuclei of the Sn^{4+} ions situated in the octahedral sublattice. On the other hand, since the total magnetization of the rare-earth garnet below the compensation point presumably coincides with the direction of the magnetic moment of the rare-earth sublattice, it is of interest to ascertain whether this circumstance influences the sign of the field H_{eff} at the tin nuclei.

The compensation temperature T_c of $Gd_{2.7}Ca_{0.3}Fe_{4.7}Sn_{0.3}O_{12}$ is 175 ± 0.5°K. The Curie point of this compound is 500 ± 1°K [4].

We investigated the Mossbauer effect on Sn^{119} nuclei. The sign of the field H_{eff} at the Sn^{119} nuclei was determined with the aid of an external 21-kOe magnetic field. The external field was produced by a permanent magnet and was perpendicular to the direction of the γ radiation. The measurements were made at temperatures 95 and 300° K. The Mossbauer spectra of the compound $Gd_{2.7}Ca_{0.3}Fe_{4.7}Sn_{0.3}O_{12}$ were plotted with a previously described setup [5]. The absorber contained tin enriched with Sn^{119} to 87%. The source was $Sn^{119}O_2$ at room temperature.

The experimental spectra are shown in Figs. a and b. The obtained values of the effective magnetic field acting on the Sn^{119} nuclei in the $Gd_{2.7}Ca_{0.3}Fe_{4.7}Sn_{0.3}O_{12}$ are listed in the table. The sign of the field H_{eff} at the Sn^{119} nuclei is assumed positive if this field coincides with the direction of the total magnetization of the sample.

The positive sign of H_{eff} at 300°K coincides with the sign of the field at the tin nuclei in the yttrium garnet [1,2]. This confirms the hypothesis [4] that the tin ions in the substituted gadolinium garnet are arranged in an octahedral sublattice.

Experiment has shown that on going through the compensation point, the effective magnetic field at the Sn^{119} nuclei reverses its sign with respect to the direction of the total magnetization of the sample.

It is known [3] that in gadolinium garnets, both above and below the compensation point, the effective fields at the tin nuclei coincide in magnitude with the values of these fields in yttrium garnets. This means that the field H_{eff} at the tin nuclei is "rigidly bound" to the iron sublattices. In such a case, the change of the sign of H_{eff} at the Sn nuclei on going through the compensation point signifies that in this case the total magnetic moment of the sample changes its direction relative to the direction of the magnetic moment of the iron sublattices.

This result proves directly the change in the sign of the summary magnetic moment of the gadolinium garnet on going through the compensation point. But the change of sign is connected with an increase of the magnetic moment of the gadolinium sublattice below T_k. Therefore the results of this experiment are also proof that the magnetic moments of the rare-earth and iron sublattices in gadolinium garnet are oriented in opposite directions.

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HELIUM DISCHARGE-CONDENSATION CHAMBER

Z. Sh. Mandzhavidze, A. K. Dzhavrishvili, and V. N. Roinishvili
Institute of Physics, Georgian Academy of Sciences
Submitted 12 March 1968
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In [1, 2] we proved the possibility of realizing a new discharge-condensation method of recording tracks of charged particles, in which the selected events are recorded in two successive stages based respectively on the discharge and condensation principles.

The discharge-condensation chamber combines to a considerable degree a number of specific features of such elementary-particle detectors as spark and condensation chambers. Besides the high time resolution and the large memory of the selected event, notice should also be taken of such features of the discharge-condensation chamber as complete isotropy, good spatial resolution, large track brightness, and the possibility of using practically any gas as the working medium.

Of particular interest is the development of helium and hydrogen discharge-condensation chambers. Such chambers, owing to their controllability and the possibility of exposure in high-intensity beams, should not be inferior to helium and hydrogen bubble chambers with respect to efficiency of utilization of the working medium as the target.

In the present investigation our purpose was to demonstrate the feasibility of creating a discharge-condensation chamber filled with helium. Figure 1 shows photographs of cosmic-ray particle tracks in a helium discharge-condensation chamber of 30 cm diameter and 8 cm depth. The chamber was filled with pure helium and with saturated ethyl-alcohol vapor to a pressure of 1.2 atm. The expansion ratio was 1.08, and the pulsed light source power was 200 J. The tracks were photographed on film having a sensitivity of 1000 GOST-0.85 units with a delay of 30 msec following the start of the expansion at a relative lens aperture 1:22. The same figure shows an oscillogram of a high-voltage pulse with a peak electric field intensity 14.5 kV/cm applied between a perforated grid and a reticular electrode located inside the working volume of the chamber at the front glass.

Figure 2 shows for comparison photographs of tracks in a neon discharge-condensation chamber and an oscillogram of the corresponding high-voltage pulse. Comparison of these photographs shows that at identical working-mixture pressures, expansions, and photography