FLAC-R 69-0347

area can be expected in the elastic and inelastic scatterings, as $v = 4.36 \times 10^7$ cm/sec for 5 MeV proton and ^{70}Ge. The details of this work will be published elsewhere.

The authors are indebted to the other members in the experimental group for helpful discussions.

1. A. P. Tulinov, Doklad. Akad. Nauk. SSSR 162 (1965) 546, Soviet Phys. Doklady 10 (1965) 463.
2. D S. Gemmell and R. E. Holland, Phys. Rev. Letters 14 (1965) 945.
3. M. Maruyama et al., Phys. Letters.
4. J. U. Andersen, Mat. Fys. Medd. Dan. Vid. Selsk. 36 no. 7 (1967).
5. G. Molière, Z. Naturforsch. 2a (1947) 133.

* * * * *

THE ELECTRONIC SPECIFIC HEAT OF THE HIGH PRESSURE PHASE OF GALLIUM

R. FLACH and C. PALMY
Laboratorium für Festkörperphysik, Eidgenössische Technische Hochschule, Zürich, Switzerland

Received 17 June 1969

We have measured the critical magnetic field curve of the high pressure phase of superconducting Ga. For a pressure of about 20 katm, the critical field at $T = 0$, H_0, is found to be 620 Oe and the critical temperature T_c is 6.24°K.

It is well known from experiments by Bridgman [1] that gallium undergoes a phase transition at pressures between 15 katm and 30 katm according to temperature. Buckel and Gey [2] found that the high pressure modification of gallium, which is generally referred to as GaII, is a superconductor with a transition temperature, T_c, of 6.3°K. We have measured the critical field, H_c, as a function of temperature in this high pressure phase. The results are shown in fig. 1. The experimental method employed and the cryostat will be described elsewhere [3].

From a knowledge of T_c and H_0, the critical field at $T = 0$, the electronic specific heat constant γ can be calculated from the well known relation:

$$\gamma = \tfrac{1}{4}\pi V f''(0) H_0^2 / T_c^2 \qquad (1)$$

where V is the molar volume and $f''(0)$ is the second derivative of the reduced critical field function $f(t) = H_c/H_0$ at $T = 0$. For GaII we find γ to be 1.63 m joule/°K^{2}mol. This value is larger by a factor 2.3 than the abnormally low value for GaI. This result can be understood, at least qualitatively, since the orthorhombic GaI, with a c/a ratio of 1.7 transforms into the tetragonal structure which is practically the same as that of indium [4]. Thus one expects a simpler Fermi surface because the total number of conduction bands is reduced. In fact, the measured value of γ lies close to the values of In and Al. On the basis of the free electron model one would expect a value for γ for 0.92 mJ/K^{2}mol. This indicates that GaII has a nearly free electron Fermi surface similar to those of its neighbours aluminium and indium. The values for γ given in table

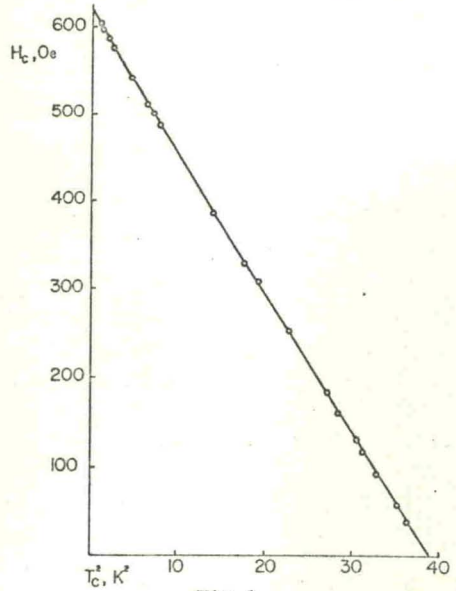

Fig. 1.