

Table 1

Composition	Transition	$T_{k0}$ (°K)	$\sigma_s$ (e.m.u./g)	$\partial H_k/\partial T$ (Oe/deg)	$\Delta S$ (erg/g deg)	$\Delta Q$ (cal/g)
$Mn_2Ge_{0.12}Sb_{0.88}$	AF-SP	285	16.4	$3.57 \times 10^3$	$5.84 \times 10^4$	0.4
	AF-FM	324	23.2	$3.96 \times 10^3$	$9.2 \times 10^4$	0.71
$Mn_2Ge_{0.16}Sb_{0.84}$	AF-SP	327	10.8	$3.23 \times 10^3$	$3.5 \times 10^4$	0.27
	AF-FM	372	13.1	$4.41 \times 10^3$	$5.78 \times 10^4$	0.513
$Mn_2Ge_{0.20}Sb_{0.80}$	AF-FM	370	7.1	$4.28 \times 10^3$	$3.04 \times 10^4$	0.269

Explanation of the magnetic field nature. In this case the fulfillment experimentally verified. It may be

(2)

of the lattice parameter change

condition (2) is fulfilled in the  $Mn_2Ge_ySb_{1-y}$  system as evidenced. Thus Kittel's theory quite satisfactory on the transition temperature, inversion. But it is not clear of the pressure influence on the solved separately for each in that with transition the lattice pile in reality any other lattice modification of the theory logically is comparable with the measured

sure, in accordance with Kittel's on:

(3)

thermal expansion coefficient of

ons one has to make use of two

$$\frac{\partial \alpha}{\partial C} \quad (4)$$

$$M^2 \quad (5)$$

to know the entropy change  $\Delta S$ ,  $M$ , and the lattice parameter to be found from X-ray diffraction be found from magnetic measure-

sitions of the first kind gives the on magnetic field strength [7]:

$$\frac{\Delta \sigma}{S} \quad (6)$$

where  $T_{k0}$  is the transition temperature without magnetic field,  $\Delta \sigma$  the sublattice magnetization change,  $\Delta S$  the change of entropy of the spin system at transition.

From the temperature dependence of magnetization,  $\sigma(T)$ , measured in strong magnetic field, it is possible to define  $\Delta \sigma$ , and from the experimental dependence  $T_k(H_k)$  it is easy to find  $(\partial H_k/\partial T_k)$ . Then on the basis of (6) it is possible to calculate the entropy change and transition heat. We have performed such calculations for all investigated samples. Table 1 gives the calculated results for three compositions in which all magnetic transformations peculiar to the  $Mn_2Ge_ySb_{1-y}$  system are observed. Using the results given in Table 1 and the X-ray diffraction investigations of the  $Mn_2Ge_ySb_{1-y}$  system [8], we have for  $Mn_2Ge_{0.12}Sb_{0.88}$

$$\frac{M^2}{\Delta C} = 3.8 \times 10^5 \text{ G}^2/\text{A}.$$

Then using  $\gamma = 2 \times 10^{12} \text{ cm}^{-1} \text{ g s}^2$  [5] it is possible on the basis of (4) to calculate

$$\frac{\partial \alpha}{\partial C} = 5.9 \times 10^4 \text{ erg/G}^2 \text{ A}.$$

Now on the basis of (5) we can define a thermal expansion coefficient of the lattice,  $(\partial C_T/\partial T) = 7.7 \times 10^{-4} \text{ A/deg}$ , and calculate using (3) the coefficient  $(\partial T_k/\partial P)$ . For  $Mn_2Ge_{0.12}Sb_{0.88}$  we obtain

$$\frac{\partial T_k}{\partial P} = 4.25 \text{ deg/katm}.$$

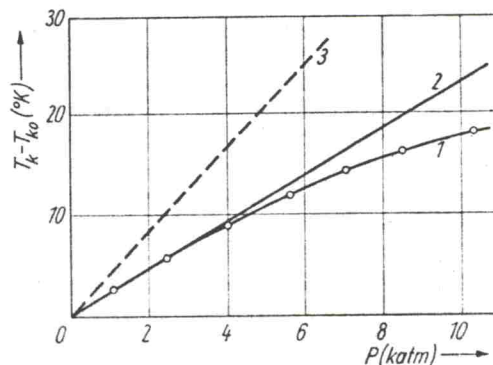


Fig. 5. Comparison of experimental and calculated dependences of pressure influence on the shift of the transition temperature in  $Mn_2Ge_{0.12}Sb_{0.88}$ . Curve 1 is an experimental one, curve 2 is the tangent to the experimental dependence, and curve 3 is the calculated dependence