the condition for lattice stability imposes a limitation on its constant λ. This limitation must be taken into account in estimates of the possible values of the critical temperature.

In most metals $\zeta \sim 1/3 - 1/5$. Hence, according to (7), $\lambda \lesssim 1/4 - 1/6$. We then obtain, for the values $\Delta E \sim 0.1$ eV given by Geilikman [3], $T_c \sim 10 - 10^3$ °K. It is also obvious that, in contrast to ordinary superconductivity, we can hope to obtain here high critical temperatures in substances having only weak electron-phonon interaction.

We can estimate the temperature T_K at which the lattice instability appears for the first time.

Using temperature Green's functions [4], we obtain for this temperature the expression (for $T_K \ll \epsilon_F$)

$$T_k = \frac{2\sqrt{3}}{\pi} \epsilon_F \sqrt{\frac{2}{1 - 2\lambda} - \frac{1}{\zeta}} . \tag{8}$$

We see that when $\lambda > \lambda_{cr} = 1/2 - \zeta$ the value of T_K increases very rapidly and certainly exceeds the critical temperature of the superconducting transition.

In conclusion, we thank V. L. Ginzburg and L. V. Keldysh for a discussion of the work.

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A POSSIBLE EXPERIMENT FOR FINDING SUPERCONDUCTORS WITH DIFFERENT PAIR MULTIPLICITY

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It has been assumed in many papers that certain superconductors can be in the triplet state, or generally in a state with $l \neq 0$ (cf. e.g. [1, 2]). It is obviously necessary now to check these assumptions experimentally, but this is not so simple. One possible experiment for finding superconductors with different l may be the Josephson tunneling. Indeed, the angular-momentum conservation law forbids the Josephson effect for structures consisting of superconductors with pairs in different orbital states. This is seen mathematically already from the fact that the Josephson current is proportional to [1)]

$$\iint d\Omega_1 d\Omega_2 |T_{kq}|^2 \Delta^+(\vec{k})\Delta(\vec{q}) \sim t_{l_1} d_{l_1 l_2} \delta_{m_1 m_2},$$

where we have put $\Delta(\Omega) \sim Y_{lm}(\Omega)$ and carried out the expansion

$$|T_{kq}|^2 = 4\pi \sum_{\ell m} t_\ell Y_{\ell m}(\Omega_1) Y^*_{\ell m}(\Omega_2). \quad (1)$$

This result can be seen in fact at an even earlier stage. Let us write the tunneling Hamiltonian in the coordinate representation:

$$V_{(T)} = \sum_\alpha \int d\vec{x}d\vec{x}'[m(\vec{x}\vec{x}')\psi_\alpha^+(\vec{x})\chi_\alpha(\vec{x}') + m^*(\vec{x}'\vec{x})\chi_\alpha^+(\vec{x}')\psi_\alpha(\vec{x})], \quad (2)$$

where

$$m(\vec{x}\vec{x}') = \sum_{kq} T_{kq} \exp(i\vec{k}\cdot\vec{x} + i\vec{q}\cdot\vec{x}'), \quad (3)$$

and let the operators ψ and χ pertain to the left and right superconductors, respectively. The remaining calculation is similar to that in [4]. The current to the left is equal to

$$I_1 = 2e\langle \dot{N}_1^\alpha \rangle = i2e\langle [N_1^\alpha, V_T] \rangle, \quad (4)$$

where

$$N_1^\alpha = \int \psi_\alpha^+(\vec{x})\psi_\alpha(\vec{x})\,d\vec{x}. \quad (5)$$

Substituting (2) and (5) in (4) we get

$$I_1 = 4e \,\mathrm{Im} \int d\vec{x}d\vec{x}' m(\vec{x}\vec{x}')\langle \psi_\alpha^+(\vec{x})\chi_\alpha(\vec{x}')\rangle. \quad (6)$$

We carry out the subsequent calculations for zero temperature and voltage. To find the average in (6) it is convenient to introduce the function $K_\alpha(x, x') = \langle T\tilde{\psi}_\alpha^+(x)\tilde{\chi}_\alpha(x')\rangle$, go over in it to the interaction representation [5], and expand the S matrix in a series, retaining the first two terms. The latter corresponds to the usual approximation in the theory of this effect.

It is then easy to obtain

$$K_\alpha(x, x') = -i\int dx_1 dx_1' \Big\{\tilde{m}(x_1, x_1')\sum_{m\beta} F^{+(1)}_{m\alpha\beta}(xx_1)F^{(2)}_{m\beta\alpha}(x_1'x') + \tilde{m}^*(x_1'x_1)G^{(1)}_\alpha(x_1x)G_\alpha(x'x_1'), \quad (7)$$

where $\tilde{m}(x_1, x_1') = m(\vec{x}_1, \vec{x}_1')\delta(t_1 - t_1')$ and the Gor'kov-Galitskii procedure is used [2]. The second term in (7) then yields zero and the first term differs from zero (and consequently the current is not equal to zero) if both superconductors are in identical orbital states. Substituting (7) in (6), going over to the momentum representation, and using the expressions obtained in [2] for the functions F, we get

$$I_1 = \sin(\varphi_1 - \varphi_2)2eN_1(0)N_2(0)\iint_{-\infty}^{+\infty} d\xi_1 d\xi_2 \frac{1}{\epsilon_1\epsilon_2(\epsilon_1+\epsilon_2)} \iint \frac{d\Omega_1 d\Omega_2}{(4\pi)^2}|T_{kq}|^2 \sum_{m\beta} \Delta^{+(1)}_{m\alpha\beta}(\vec{k})\Delta^{(2)}_{m\beta\alpha}(\vec{q}) \quad (8)$$

(φ_1 and φ_2 are the phases of the pair states to the left and to the right of the barrier). Experiment shows that the energy dependence of $|T_{kq}|^2$ and Δ can be neglected. Considering symmetrical structures, and using (1) and the representation [2] $\Delta_{m\alpha\beta}(\Omega) = \Delta_m \hat{I}_{\alpha\beta} Y_{\ell m}(\Omega)$, we get

$$I_1 = 2e\pi^2\Delta t_\ell N_1(0)N_2(0)\sin(\varphi_1 - \varphi_2) \quad (9)$$

Alternately, introducing the juncture resistance in the normal state

$$1/R_{nn} = 4\pi e^2 N_1(0) N_2(0) \iint \frac{d\Omega_1 d\Omega_2}{(4\pi)^2} |T_{kq}|^2 = 4\pi e^2 N_1(0) N_2(0) t_0,$$

we get ultimately

$$I_1 = \frac{\pi}{2} \frac{\Delta(\ell)}{eR_{nn}} \frac{t_e}{t_0} \sin(\varphi_1 - \varphi_2). \tag{10}$$

Equation (10) shows that experiment cannot identify the state of the superconductors.

In our opinion, to find superconductors with different ℓ it is necessary to start with "transition element - principal-group element" structures. The samples, of course, must be of sufficiently large size so that no Larkin effect [6] appears in any of the cases.

In conclusion we note that in this experiment ℓ is not a sufficiently good quantum number. It is therefore more likely that we will be able to distinguish between superconductors with different pair multiplicities.

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1) In the more general case, putting $\vec{k} \to -\vec{k}$ and $\vec{q} \to -\vec{q}$ and recognizing that $\Delta(-\vec{k}) = \Delta(\vec{k})$ and $\Delta(-\vec{q}) = -\Delta(\vec{q})$, we find that the Josephson current equals zero for superconductors with different pair multiplicities.

SPECTRUM OF ELECTROMAGNETOLUMINESCENCE IN InSb

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We obtain in this paper the spectral distribution of recombination radiation caused by the magnetoconcentration effect (electromagnetoluminescence - EML) in InSb at room temperature [1]. It has been observed that the character of the spectral distribution of EML differs from the spectra of recombination radiation excited by other known means, and the maximum of the spectral emission of EML depends on the intensities of the electric and magnetic fields.

Recombination radiation was excited by applying a pulsed electric field to a sample of