is shown in Fig. 2. The dashed curve pertains to the non-irradiated (control) sample. The fact that the jumps increase only at higher temperatures and that they are completely annealed-out subsequently may be possibly attributed to the production of complexes of point defects by the irradiation.

From the sizes of the steps we find that portions of the sample, with approximate volume 10^{-5} cm^3, i.e., a volume close to the volume of a whole domain, may experience sudden reversal of magnetization, just as in the so-called "large" Barkhausen jumps observed in polycrystals subjected to tension or torsion [3,4], when the hysteresis loop becomes nearly triangular, and in thin magnetic films [5].

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LOCALIZATION OF SPINS IN A SUPERCONDUCTOR

O. S. Akhtyamov and E. I. Fedorov
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There are by now many papers devoted to the influence of magnetic impurities on superconductivity. However, no less important or interesting is the study of the influence of superconductivity on spin localization. Insofar as we know, there are as yet no experimental or theoretical papers on this subject.

Localized magnetic states in a metal were investigated by Friedel [1], Anderson [2], and later by others. This raises the question: does superconductivity enhance or hinder the localization of spins? From the point of view of the ideas of Friedel and Anderson, one can expect localization of a virtual level if its energy lies inside the gap. It follows therefore that superconductivity should contribute to spin localization. Let us consider this question on the basis of Anderson's model [2,5]:

$$H_{os} = \sum_{k\sigma} \varepsilon_k a^+_{k\sigma} a_{k\sigma}, \qquad H_{od} = \sum_{\sigma} E b^+_{d\sigma} b_{d\sigma}, \qquad H_{dd} = \frac{1}{2}\sum_{\sigma} U b^+_{d\sigma} b_{d\sigma} b^+_{d-\sigma} b_{d-\sigma},$$
$$H_{sd} = \sum_{k\sigma} (V_k a^+_{k\sigma} b_{d\sigma} + V^*_k a_{k\sigma} b^+_{d\sigma}). \tag{1}$$

We add the interaction that leads to superconductivity [3]:

$$H_{BCS} = \frac{1}{2}\sum_{kk'\sigma} W_{kk'} a^+_{k\sigma} a^+_{-k-\sigma} a_{-k'-\sigma} a_{k'\sigma} .$$

We introduce the Green's functions [4]

$$\begin{aligned} G^\sigma_d &= \langle\langle b_{d\sigma}(t) | b^+_{d\sigma}(t')\rangle\rangle , \\ G^\sigma_{kd} &= \langle\langle a_{k\sigma}(t) | b^+_{d\sigma}(t')\rangle\rangle , \\ G^{+\sigma}_{kd} &= \langle\langle a^+_{-k-\sigma}(t) | b^+_{d\sigma}(t')\rangle\rangle , \end{aligned} \tag{2}$$

for which we write out the equations in the Hartree-Fock approximation

$$\begin{aligned} [\eta - E_\sigma]G^\sigma_d &= \frac{1}{2\pi} + (1 - 2n^\sigma_d)\sum_k V^*_k G^\sigma_{kd} , \\ [\eta - \mathcal{E}_k]G^\sigma_{kd} &= V_k(1 - 2n_k)G^\sigma_d + \Delta(\vec{k})G^{+\sigma}_{kd} , \\ [\eta + \mathcal{E}_k]G^{+\sigma}_{kd} &= \Delta^+(\vec{k})G^\sigma_{kd} , \end{aligned} \tag{3}$$

where $E_\sigma = E + Un^{-\sigma}_d$, n^σ_d is the occupation number of the d-state with spin projection σ, and n_k is the occupation number of $\vec{k}$-states of the s-electrons. Solving the system (3), we obtain the function

$$G^\sigma_d = \frac{1}{2\pi}\;\frac{1}{\eta - E_\sigma - \kappa_\sigma} , \quad \kappa_\sigma = (2n^\sigma_d - 1)\sum_k \frac{V^2_k(2n_k - 1)(\eta + \mathcal{E}_k)}{\eta^2 - (\mathcal{E}^2_k + \Delta^2)} . \tag{4}$$

From (4) we obtain the width of the virtual level for T = 0 (just as in [2], we neglect the energy shift of the d-states):

$$\mathrm{Im}\,\kappa_\sigma = \sigma\pi\langle V^2_k\rangle N(0)(\eta^2 - \Delta^2)^{1/2}/|\eta|, \quad (\sigma = \pm 1), \tag{5}$$

where N(0) is the density of the s-states at the Fermi level. When $\Delta = 0$, Eq. (5) goes over into Eq. (21) of Anderson's paper [2]. This equation shows that the superconductivity actually enhances the localization of the d-states. Moreover, it follows from (5) that the alloy may reveal the existence of localized spins at $T < T_c$ and not exhibit spin localization at $T > T_c$ (at $\eta = E_\sigma \leq \Delta$).

It would be of interest to check our conclusions experimentally. Generalization to finite temperatures and further results will be reported later.

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E R R A T A

In the article by O. S. Akhtyamov and E. I. Fedorov, V. 4, No. 10, p. 280:

1. The factors $(1 - 2n_{d,k})$ should be replaced by unity throughout the paper.

2. Following this substitution, the general formula (4) remains in force, but (5), which follows from (4), takes the form

$$\operatorname{Im} \kappa(\eta) = -\pi < |V_k|^2 > N(O)\eta / (\eta^2 - \Delta^2)^{1/2}$$

This error was noted by S. V. Vonsovskii and M. S. Svirskii, to whom the authors are grateful.