

Investigations of UBe_{13} of other compounds of Be and U in normal and superconductive states

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Abstract. During the last few years superconductive systems of heavy fermions with highly large values of m^* and electronic heat capacity γT have been thoroughly investigated.

The following compounds viz $CeCu_2Si_2$ ($T_c=0.6$ K; $\gamma=1100^*$), UBe_{13} ($T_c=0.95$ K; $\gamma=1000$) and UPt_3 ($T_c=0.5$ K; $\gamma=450$) (I) may be referred to such systems as well as the U and Ce compounds: U_2PtC_2 ($T_c=1.47$ K; $\gamma=75$), U_6Fe ($T_c=3.86$ K; $\gamma=25$), U_6Co ($T_c=2.3$ K; $\gamma=21$), URu_2Si_2 ($T_c=0.68$ K, $\gamma=17.6$), as well as α -U ($T_c=2.1$; $\gamma=12$), $CeRu_3Si_2$ ($T_c=1$ K; $\gamma=39$), $CeOs_2$ ($T_c=1.1$ K; $\gamma=22$), $CeRu_2$ ($T_c=6$ K; $\gamma=23.3$) and α -Ce ($T_c \lesssim 2$ K; $\gamma=14$) (Alekseevskii and Homskiy 1985).

It should be noted that there exists a class of U and Ce compounds with a similar structure as those given above, which undergo transition to superconductive state, but are not characterized by abnormal values of m^* (Alekseevskii 1984).

Many authors considered superconductivity of heavy fermion systems as unusually anisotropic where charge carrier coupling occurs in P-state (Stewart 1984). On the other hand such a view does not agree with many experimental results, e.g. lack of anisotropy H_{c2} for UBe_{13} (Alekseevskii *et al* 1985) as predicted by Gorkov (1984) and the results of investigation of the Josephson effect. The Hall-effect investigations for UBe_{13} in a wide range of fields and temperatures (Alekseevskii 1984) make it possible to consider systems with two types of carriers—heavy and light. The unique properties of the above systems in a number of cases are possibly caused by these two types of carriers and the peculiarity of interaction between them.

Keywords. Heavy fermions; superconductive systems.

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