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Thermoelectric properties of non-fermi liquid systems [1]

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The non-Fermi liquid (NFL) ground state in strongly correlated electron systems, which are subjects of intensive theoretical and experimental studies may have different physical origins. On one hand, a number of NFL systems have been suggested to locate near to a quantum critical point at $T = 0$ K. The NFL properties of these systems in general are caused by fluctuations of an order parameter in the vicinity of second-order phase transition. On the other hand, NFL behaviour observed in diluted f-electron systems has been attributed to connect with some kind of disorder. In the latter systems, multichannel Kondo effect or distribution of the Kondo temperatures are possible sources of NFL behaviour. To distinguish one from another mechanisms responsible for NFL phenomenon, one usually takes into consideration the temperature dependence of several physical quantities like specific heat, electrical resistivity and magnetic susceptibility. Here, based on the data of the solid solutions $U_{1-x}Y_xAl_2$, we demonstrate that the deviation from the prediction of the Femi liquid theory shows up in the thermoelectric power *S(T)* properties for $x = 0.9$ and 0.95. Moreover, the observed characteristic $S(T) \sim AT^{1/2}$ dependence in these alloys implies the two-channel Kondo effect to be the most probable mechanism. Complementary measurements of magnetoresistance in fields up to 9 T provide a consistent support for the suggestion.

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