Observation of non Fermi liquid behaviour in new Yb- and U-based alloys*

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Non Fermi liquid (NFL) behaviour found in some strongly correlation *f*-eletron systems has attracted much attention in the recent decade. In these systems the specific heat, magnetic susceptibility, and electrical resistivity have unusually weak power law and/or logarithmic temperature divergences at low temperatures. In spite of much effort and progress during those years, there remain still many unanswered questions about the mechanisms for NFL behaviour and its close relationship to the quantum critical points (QCP).

In this contribution, after mention of existing theoretical models, I will review the evidence for NFL behaviour in $Yb(Cu_{1-x}Si_x)_{2-y}$ and $URh_{1-x}Ru_xGe$ systems, that we have investigating for the last years in our Lab [1-2]. The first system crystallises in the hexagonal AlB_2-type structure and exhibits a dramatic change in the electronic properties upon change of the electron concentration. Undoped $YbSi_{2-y}$ is of intermediate valent system, whereas the doping of 10% Cu ensures $\chi(T) \propto T^n$, $\rho(T) \propto T$ and $C_p \propto T^{-1/2}$ dependences. Comparison of the data with *the Griffiths phase model* [3] finds that this model can describe some of the observed results.

URhGe of the orthorhomic TiNiSi-type structure is a well known ferromagnet with T_C = 9.5 K [4]. This material is famous due to simultaneously showing of an unconventional superconducting state below 0.25 K [5]. The substitution of Rh by Ru suppresses ferromagnetic order at x = 0.38 [6] and it is worthwhile and interesting phenomenon to be studied since the vanishing of ferromagnetism accompanies the formation of a NFL phase [2]. It was observed that the NFL behaviour in the investigated system ($\chi(T) \propto T^n$, $\rho(T) \propto T$) is easily depressed by application of a magnetic field. The results of magnetization, electrical resistivity and magnetoresistance measurements strongly imply that the x = 0.38 alloy locates nearby a magnetic instability.

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