Enhancement of thermal transport in the degenerate periodic Anderson model

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The low-temperature transport coefficients of the degenerate periodic $SU(N)$ Anderson model are calculated in the limit of infinite correlation between f electrons, within the framework of dynamical mean-field theory. We establish the Fermi liquid laws, taking into account the quasiparticle damping. The latter yields a reduced value of the Lorenz number in the Wiedemann-Franz law. Our results indicate that the renormalization of the thermal conductivity and of the Seebeck coefficient can lead to a substantial enhancement of the electronic thermoelectric figure-of-merit at low temperature.

Taking into account the crystal field splitting, we discuss the low-temperature anomalies that show up in the electrical resistance of the intermetallic compounds with Cerium and Ytterbium ions, when studied as a function of pressure. Our calculations explain the sharp maximum of the coefficient of the T^2-term of the electrical resistance and the rapid variation of residual resistance found in a number of Ce and Yb intermetallics at some critical pressure. The anomalies are related to the pressure-induced variation of the Fermi volume.

9.7 cm

13.4 cm

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