Abstract submitted to the
NATO ADVANCED RESEARCH WORKSHOP
New materials for thermoelectric applications: theory and experiment
September 19 - 25, 2011 Hvar, Croatia

Thermoelectric transport across the metamagnetic transition in $CeRu_2Si_2$

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Submitted : 09-09-2011
Keywords : Metamagnetism, Heavy fermions, Thermopower

The nature of the metamagnetic transition (MMT) in the canonical heavy fermion compound $CeRu_2Si_2$ is still to be determined, after thirty years of investigation. The MMT presents only crossover-like features where thermodynamic properties peak but never diverge close to the transition field of 7.8 T. They are consistent with a continuous Fermi liquid ground state at low temperatures linking the low and high field sides of the MMT [1]. Meanwhile the residual electrical transport across the MMT shows only weak anomalies, which were argued to be consistent with a non-symmetry breaking topological transition driven by strong Zeeman splitting [2].

We present a new high-resolution study of in-plane thermoelectric power and thermal conductivity in $CeRu_2Si_2$ at temperatures below 1 K and in magnetic fields up to 12 T, extending the range of previous work considerably [3]. Thermopower and thermal conductivity are unique probes that are sensitive to both thermodynamic and transport properties that provide qualitatively new information about the metamagnetic crossover.

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