

HIGH-MAGNETIC FIELD THERMAL-EXPANSION AND MAGNETOSTRICTION OF URu_2Si_2

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We have performed high magnetic field (up to 45 T) thermal-expansion and magnetostriction experiments on URu_2Si_2 single crystals. The experiments were carried out in both superconducting and resistive magnets using three different dilatometers, made of copper or titanium.

The volume change associated with the transition to the “hidden” order phase becomes increasingly discontinuous as the magnetic field is raised above 30 T. This confirms recent thermal conductivity [1] and specific heat [2] experiments indicating a strong coupling between the “hidden” order parameter and the lattice which suggest some sort of charge ordered state. Several other transitions are observed at higher fields, many of them showing hysteresis, while a change in the sign of the magnetostriction coefficient is observed at the metamagnetic transition (38 T).

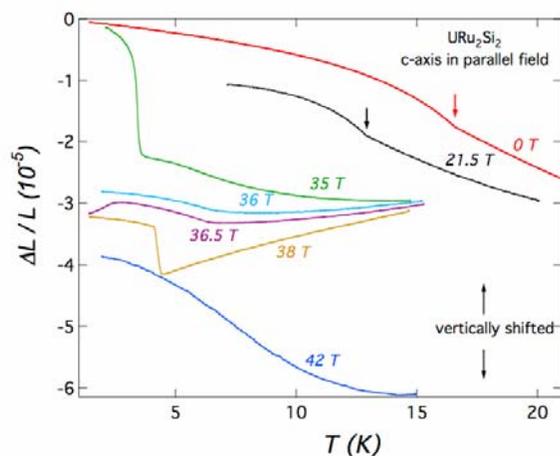


Figure 1. Thermal expansivity along the c-axis. The transition to the “hidden” order phase becomes first order around 35 T.

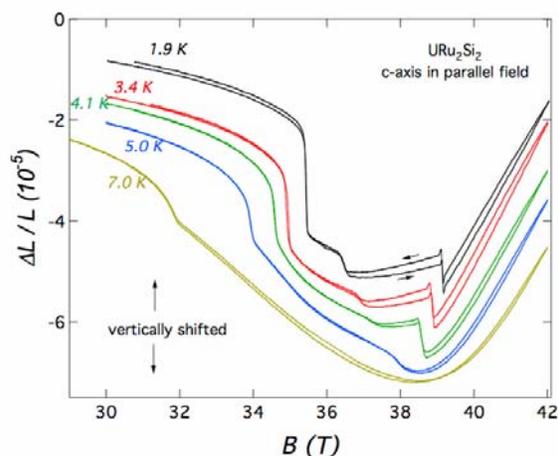


Figure 2. Linear c-axis magnetostriction. Many transitions are observed at low temperatures and high fields.

Acknowledgements

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References

- [1] Sharma, P.A., *et al.*, cond-mat/0507545 (2005).
- [2] Silhanek, A.V., *et al.*, Phys. Rev. Lett., **95**, 026403 (2005).