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The Magnetocaloric Effect in CeAuGe: Scaling Behaviour in the Vicinity of a Ferromagnetic Phase Transition

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The magnetocaloric effect (MCE) may become strongly enhanced in systems exhibiting a second order magnetic phase transition due to critical behaviour of the order parameter in close proximity of the transition region. Recently it has been shown that, analogous to the order parameter, the MCE shows scaling behaviour with the applied magnetic field along the critical isotherm. It has been argued that this behaviour should be indicative of the universality class of the system. Using ferromagnetic CeAuGe as a model system with high crystallographic and atomic order, we have determined the MCE from specific heat measurements in various applied fields. In the low field limit we observe scaling behaviour reminiscent of a mean field ferromagnet. However, in progressively larger applied fields the MCE in CeAuGe significantly exceeds that of the mean field reference system, indicating that the refrigeration capacity of CeAuGe is significantly larger than that of a model mean field ferromagnet. Our results are contextualized in terms of a more general amenability of local-moment magnetic compositions as model systems for magnetic refrigeration.

Level (Hons, MSc, PhD, other)?

PhD

Consider for a student award (Yes / No)?

No

Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

Yes

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