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Sign change of the Grüneisen parameter and magnetocaloric effect near quantum critical points MARKUS GARST, Theoretical Physics Institute, University of Minnesota, USA, ACHIM ROSCH, Institute for Theoretical Physics, University of Cologne, Germany — Strong fluctuations near a quantum critical point lead to a singular entropy distribution in the phase diagram. This results in strong signatures of the Grüneisen parameter and the magnetocaloric effect. In particular, a sign change of the Grüneisen parameter coincides with the accumulation point of entropy in the phase diagram. If the quantum critical point is the endpoint of a line of finite temperature phase transitions the sign change generically occurs in the Ginzburg regime of the classical transition as observed in several heavy fermion compounds. In addition, we predict a sharp peak in the Grüneisen parameter at the critical temperature due to the contribution of classical critical fluctuations. For magnetic field tuning these signatures are also reflected in the magnetocaloric effect. Moreover, we discuss the case of metamagnetic quantum criticality where the sign change is located at the critical magnetic field.

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