



LC-Circuit Calorimetry

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We present a new type of calorimeter in which we couple an unknown heat capacity with the aid of Peltier elements to an electrical circuit. The use of an electrical inductance and an amplifier in the circuit allows us to achieve autonomous oscillations, and the measurement of the corresponding resonance frequency makes it possible to accurately measure the heat capacity with an intrinsic statistical error that decreases as $\sim t^{-3/2}$ with measuring time t , as opposed to a corresponding error $\sim t^{-1/2}$ in the conventional alternating current (a.c.) method to measure heat capacities. We have built a demonstration experiment to show the feasibility of the new technique, and we have tested it on a gadolinium sample at its transition to the ferromagnetic state.

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