

## Device for determining the heat capacity of an object with a significantly reduced measuring time

This device allows a highly accurate measurement of the heat capacity of an object with reduced measurement time.

**Keywords** Heat Capacity, Calorimeter

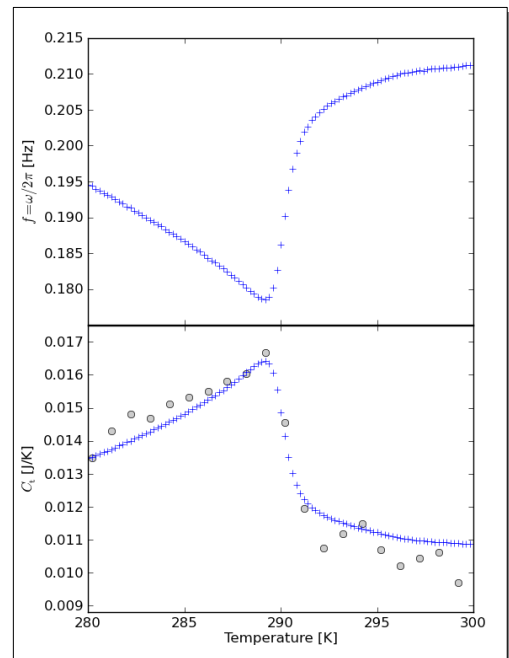
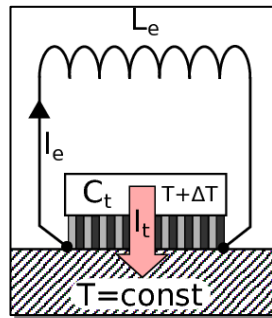
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**Reference** in preparation

**Background** Accurate heat capacity measurements are of interest in a large number of fields spanning from physics, chemistry, materials science, chemical engineering to engineering in general, either because abrupt characteristic changes in a heat capacity are of particular interest, or simply because the thermal response of a material to a certain heating or cooling power needs to be known. Numerous techniques have already been developed for the accurate measurement of heat capacities. To reduce the statistical error, corresponding data are usually averaged over a number of measurements  $N$ , yielding an uncertainty that always decreases as  $N^{-1/2}$  (or  $t_m^{-1/2}$  with the total measuring time  $t_m/N$  if each measurement takes a constant amount of time).

### Invention

A device (calorimeter, see sketch to the right) is provided, where the heat capacity is related to the oscillation frequency instead of the amplitude, such that the statistical error decreases much more rapidly, i.e., as  $t_m^{-3/2}$ . For example, to reduce the statistical error by a factor of 10, conventional methods require a 100 times longer duration of a measurement, while the present thermal LC method needs only a 5 times longer data acquisition time (see measurement example to the right).



**Patent Status** Patent Application filed

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