# Thermodynamics of Mesoscopic Superconductors

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The superconductive phase transition involves thermal and electrodynamic relaxation processes of the control variables, the electrodynamic relaxation being three orders of magnitude faster than the thermal relaxation. This potentially renders the time differences of the control variables observable in the mesoscopic size range. [1-3]

An experiment [4] that investigated magnetization change during the phase transition of a mesoscopically sized tin specimen will be used to extrapolate the thermodynamics.

[1] P.D. Keefe, Quantum mechanics and the second law of thermodynamics: an insight gleaned from magnetic hysteresis in the first order phase transition of an isolated mesoscopic size Type I superconductor, T151, 014029, IOP Publishing (2012).

[2] P.D. Keefe, Quantum limit to the second law by magneto-caloric effect, adiabatic phase transition of mesoscopic-size Type I superconductor particles, Physica E, Vol. 29, Oct. 2005, Pgs. 104-110.

[3] P.D. Keefe, Second Law Implications of a Magnetocaloric Effect Adiabatic Phase Transition of Type I Superconductor Particles, Journal of Modern Optics, V. 51, No. 16-18, pgs. 2727-2730, 10-12/2004.

[4] O.S. Lutes and E. Maxwell, Superconducting Transitions in Tin Whiskers, Phys. Rev., 97, 1718 (1955).