Size Dependency in the Phase Transition of Type I Superconductors

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The first order phase transition of a mesoscopic Type I superconductor 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 and non-isentropic, but only if the phase transition is abrupt. This is shown at Fig. 1, where either the mixed phase transition **Macro** path or the abrupt phase transition **Meso** path occurs. [1-7]

An experiment [8] investigating the superconductive to normal phase transition of Type I macroscopic wires and mesoscopic whiskers, shown at Fig. 2, suggests the answer. As in Fig. 1, the **Meso** path is abrupt, whereas the **Macro** path is mixed.

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