

Abstract Submitted
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Ballistic acceleration phase of a supercurrent¹ MILIND N. KUNCHUR, GABRIEL SARACILA², University of South Carolina — One of the primitive but elusive current-voltage (I-V) responses of a superconductor is when its supercurrent grows steadily after a voltage is first applied, as per the first London equation. Because this phase lasts for a relatively short duration—until dissipative processes set in—it is difficult to conduct a correlated time-domain I-V measurement of it. The present work employed a measurement system that can simultaneously track and correlate $I(t)$ and $V(t)$ with sub-nanosecond timing accuracy, resulting in a clear time-domain measurement of this transient phase where the quantum system displays a Newtonian like response. The highly controlled technique used here measures the near equilibrium response and should be distinguished from an impulse response measurement, which may probe non-equilibrium processes. The present technique should be of value for the controlled investigation of other types of time-dependent and non-equilibrium phenomena.

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