

Superconducting circuits as a platform for experiments on open quantum systems

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Superconducting circuits, mesoscopic reservoir and tunnel junction thermometry provide a playground for open quantum system in the sub-kelvin regime. We experimentally demonstrate two distinct approaches for thermometry. First, we extract the thermal occupation of a qubit to diagnose its coupled environment [1]. Second, we utilize bolometric sensing of a mesoscopic resistive reservoir to probe the attached superconducting circuits [2] [3]. The methods enable the observation of open quantum systems through their dissipative interplay.

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[1] Dmitrii S. Lvov et al., Phys. Rev. Applied 23, 054079 (2025).

[2] Christoforus D. Satrya et al., Nat Commun 16, 4435 (2025).

[3] Christoforus D. Satrya et al., arXiv:2510.23092.