

Superconducting qubit dephasing correlated with radiating events

A major issue currently impeding qubit error-correction is spatially correlated qubit decoherence which is likely caused by cosmic radiation. Superconducting microwave kinetic inductance detectors (MKIDs) are a promising candidate for detection of these events due to their sensitivity to phonon bursts in a substrate. We surrounded a qubit sample with two, three by three arrays of MKIDs which are placed above and below a 6-qubit chip. Detected events on an MKID chip triggered a qubit coherence measurement. We observed a drop in expected qubit T2 time outside the standard deviation for measurements made immediately after a detected event. Further research in such a system will aid in formulating mitigation strategies against errors in large-scale qubit systems.

Prepared by LLNL under Contract DE-AC52-07NA27344.

Primary author: CASTELLI, Alessandro (Lawrence Livermore National Laboratory)

Co-authors: BECK, Kristin; ALEGRIA, Loren; MARTINEZ, Luis; CHAVES, Kevin; O'KELLEY, Sean; DUBOIS, Jonathan; ROSEN, Yaniv

Session Classification: Poster Session