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New flux qubits remove sharp corners and E-field spikes

MIT LL reestablished the competitive potential of the flux qubit

Coherence N/A ~ < 10 ns (? Nb Trilayer) > 100 µs from CSQ

CALIBRATION: Resonator Q + Qubit T1 and T2

VALUATION: Resonator Q + Qubit T1 and T2

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Validation: Resonator Q + Qubit T1 and T2

Reproducibility

Coherence N/A ~ < 10 ns (? Nb Trilayer) > 100 µs from CSQ

The Work of CSQ is unfinished

• T1 & T2 vary randomly in time and over timescales that are widely disparate (from milliseconds, to days)

• Sources of noise remain unknown, and uncontrolled

• IARPA has begun a study of the enhancements possible for quantum annealing (QA) via novel architectures and operation

○ QA parameter space is vast and uncharted

○ “Optimal” for QA is unknown (i.e., coherence, designs, architecture, programming, operation...), and highly complex; even for single qubits

○ Removing and circumnavigating noise sources – by design, programming and adaptive annealing – present a significant challenge and opportunity

CSQ qubit fidelity, while not yet sufficient for gate-based computing, could be revolutionary for quantum annealing (QA)