HYDERABAD, INDIA / 7 NOVEMBER 2026

# Atomic Cubit completes simulation of its first four-qubit superconducting chip

Fabrication is the next stage.

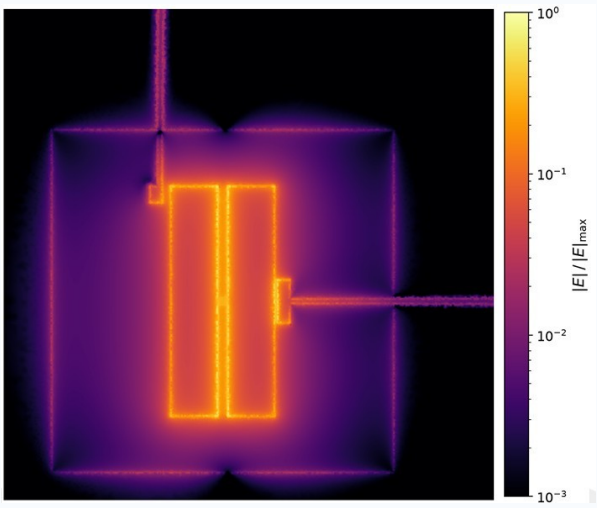
By the Atomic Cubit team

Atomic Cubit has completed the design and full-chip electromagnetic simulation of its first four-qubit superconducting chip. Simulated qubit lifetimes reach up to 165 µs in the standalone design and up to 133 µs with all four qubits coupled. The design is now progressing towards fabrication.

THE TECHNOLOGICAL CHALLENGE

## Understanding the chip before fabrication.

Fabrication can take months, making design errors costly to correct once a chip is built. Full-chip modelling evaluates how long qubits retain their state, how quickly they can be read without disturbance, and whether they remain isolated or couple as required. Predicting these behaviours before fabrication is central to developing a working device.




Simulated electric field concentrated on the qubit and around its Josephson junction.

FOUR TRANSMONS, ONE DESIGN

The chip comprises four transmon qubits at distinct frequencies to manage unwanted interactions.

Each qubit has an individual drive and a dedicated readout resonator. Coupling between the qubits is designed to support two-qubit gates.

SIMULATION RESULTS

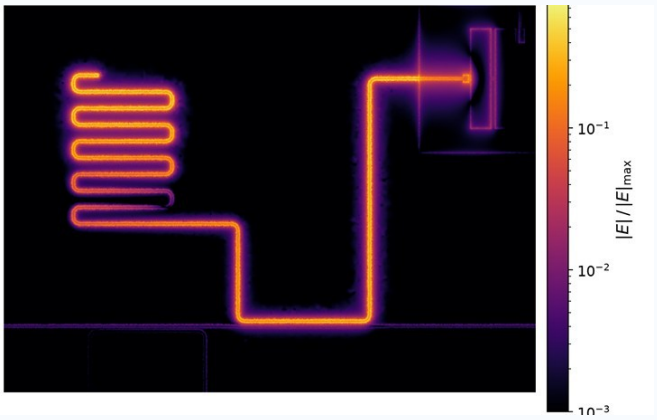
# Qubit and readout performance.

| 165 µs | 133 µs | 3.68 million |
|---|---|---|
| Maximum lifetime: standalone | Maximum lifetime: coupled | Maximum quality factor: coupled |

The simulations report qubit frequencies spanning 4.4-5.0 GHz. Each qubit retains 98-99% of its energy in its own Josephson junction, indicating the clean, isolated-qubit behaviour described in the design.

DEDICATED READOUT RESONATORS

## Distinct modes. Rapid signal release.




Simulated standing-wave field along a readout resonator.

| READOUT MODE | FREQUENCY |
|---|---|
| Qubit 1 | 5.96 GHz |
| Qubit 2 | 6.56 GHz |
| Qubit 4 | 6.88 GHz |

Readout quality factors range from approximately 11,600 to 13,200, with lifetimes around 0.3 µs.

The readout resonators appear as distinct modes above their qubit frequencies. Their short lifetimes are intentional: the resonators release their signal rapidly to support fast measurement.

WHAT MAKES THE APPROACH DIFFERENT

# Hardware experience. Careful design validation.

Atomic Cubit's hardware team brings hands-on experience from a superconducting-hardware programme, spanning qubit and Josephson-junction design, layout verification and circuit modelling.

The chip was analysed using full-chip finite-element electromagnetic simulation, with key results cross-checked through a second, independent modelling method. The reported performance values are simulation results, enabling comparison with measurements after fabrication.

DEVELOPMENT AND VALIDATION

## From the four-qubit design to larger processors.

Following completion of the full-chip simulations, the programme's next stages are fabrication and chip characterisation. Further design upgrades are being developed alongside this work.

This four-qubit chip establishes the modelling workflow for larger processors: evaluate the whole device and predict each qubit's behaviour before fabrication. Identifying problems in simulation rather than after a fabrication run is intended to reduce development time and cost as qubit counts grow.

ABOUT ATOMIC CUBIT

Founded in 2026 and based in Hyderabad, India, Atomic Cubit develops superconducting quantum processors through simulation, fabrication and measurement. Its hardware forms part of a broader quantum-computing stack developed alongside sister company Quantamathical.

For researchers, fabrication partners and investors interested in working with us:

**team@atomiccubit.com**