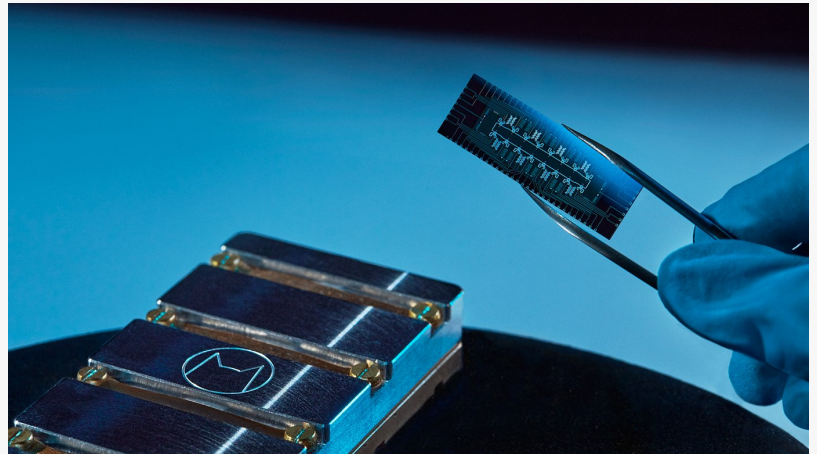


Alice & Bob tapes out quantum chip to perform error correction and to demonstrate a logical qubit prototype

Helium 1 marks a significant milestone in the company's roadmap towards a first error-corrected logical qubit and useful quantum computer

PARIS, FRANCE, December 19, 2023 /EINPresswire.com/ -- [Alice & Bob](#), a leading hardware developer in the race to fault tolerant quantum computers, today announced the tape out of a new chip expected to improve error rates with every qubit added, making it a prototype for the company's first error-corrected, logical qubit.



The 16-qubit quantum processing unit (QPU), Helium 1, is the first chip in Alice & Bob's roadmap combining cat qubits to run an error correction code. The company will be able to use this platform to create its first logical qubit with error rates lower than any existing single physical qubit. With the tape-out complete, the chip enters a characterization and calibration phase that will be followed by a release on the cloud.

“

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Théau Peronnin, CEO of Alice & Bob

The quantum industry is at the dawn of demonstrating logical qubits showing significant advantages over any existing physical qubit. Such logical qubits are the only way to achieve the extremely low error rates required by fault tolerant quantum computing.

Errors in quantum computers are caused by bit flips and phase flips. Protected from bit flips by design, cat qubits

are hardware efficient and enable logical qubit designs using significantly fewer qubits. Helium 1

will run an error correction code that actively suppresses the remaining phase flips, effectively addressing both error types.

“Our cat qubit technology already holds world records in addressing bit flips,” said Théau Peronnin, CEO of Alice & Bob. “Helium 1 is our new platform to exponentially suppress the remaining errors as we add more depth, enabling us to deliver on our clear roadmap to reach the full computational potential of quantum computers.”

Helium 1 is the first prototype which will be the basis of Alice & Bob’s “six-nines” logical qubit (with a logical error rate of 10^{-6} or lower).

About Alice & Bob

Alice & Bob is a start-up based in Paris and Boston, whose goal is to realize the first universal, fault-tolerant quantum computer. Founded in 2020, Alice & Bob has already raised 30M€ in funding, hired over 80 employees, and demonstrated experimental results surpassing those of technological giants like Google or IBM. Alice & Bob specializes in cat qubits, a technology pioneered by the company’s founders and later adopted by Amazon. Cat qubits reduce hardware requirements by up to 60 times compared to competing approaches. Demonstrating the power of its cat architecture, Alice & Bob recently showed that the number of qubits required to run the well-known Shor’s algorithm can be reduced from 20 million to 350 thousand with a cat qubit-based system.

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