



## Rigetti Computing Launches 84-Qubit Ankaa™-3 System; Achieves 99.5% Median Two-Qubit Gate Fidelity Milestone

December 23, 2024

*Ankaa-3 features a broad hardware redesign enabling superior performance. Enhancements across the technology stack include a new cryogenic hardware design, an overhaul of the qubit circuit layout, precise qubit frequency targeting with Alternating-Bias Assisted Annealing, and flexible gate architecture with precise controls. Ankaa-3 has achieved a 99.5% median two-qubit gate fidelity.*

BERKELEY, Calif., Dec. 23, 2024 (GLOBE NEWSWIRE) -- Rigetti Computing, Inc. (Nasdaq: RGTI) ("Rigetti" or the "Company"), a pioneer in full-stack quantum-classical computing, announced today the public launch of its 84-qubit Ankaa-3 system. Ankaa-3 is Rigetti's newest flagship quantum computer featuring an extensive hardware redesign that enables superior performance. Rigetti also celebrates major two-qubit gate fidelity milestones with Ankaa-3: successfully halving error rates in 2024 to achieve a median 99.0% iSWAP gate fidelity, as well as demonstrating 99.5% median fidelity fSim gates.

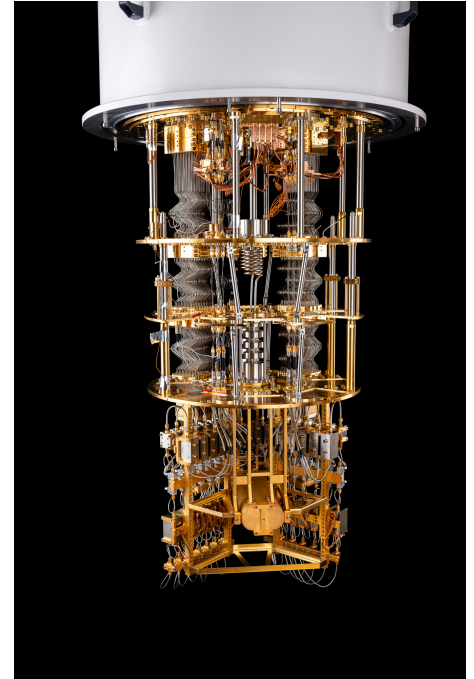
Ankaa-3 is now available to its partners via the Rigetti Quantum Cloud Services platform (QCS®) and will be coming to Amazon Braket and Microsoft Azure in the first quarter of 2025. Users will be able to operate these higher fidelity and universal iSWAP gates for a wide range of algorithmic research, with a median gate time of 72 nanoseconds. The faster (median 56 nanoseconds), more specialized fSim gates are useful for specific algorithms such as random circuit sampling, as recently demonstrated on Google's Willow system.

The Ankaa-3 system continues to feature Rigetti's scalable, industry-leading chip architecture with 3D signal delivery while incorporating major enhancements to key technologies. Leveraging the Company's full-stack expertise and in-house quantum foundry capabilities, Ankaa-3 demonstrates Rigetti's ability to deliver increasingly higher performance quantum computers.

The Company's focus on improving qubit fidelity has resulted in enhancements across the technology stack:

- **All new cryogenic hardware design** - Reducing the amount of metal at the refrigerator's coldest stage increases efficiency and reduces the cost per qubit. Superior thermalization and magnetic/environmental shielding also improves system performance. This new design enables scaling up to thousands of qubits.
- **Improved qubit chip** - Rigetti overhauled its qubit chip, leading to improved coherence. Through its collaboration with the Superconducting Quantum Materials & Systems Center (SQMS) led by Fermilab, Rigetti implemented a metal deposition method for qubit circuitry with a higher  $T_1$  baseline -- which indicates the lifetime of a qubit. Additionally, the circuit layout was optimized to minimize qubit losses and take advantage of the new higher-coherence process.
- **Josephson junction fabrication with Alternating-Bias Assisted Annealing (ABAA)** - The Ankaa-3 chip features the hallmarks of Rigetti's Ankaa-class chip architecture with a square lattice of qubits and tunable couplers. The 84-qubit chip's Josephson junctions are manufactured using Rigetti's novel ABAA technique. ABAA allows for precise qubit frequency targeting, which enables better execution of two-qubit gates and increases in yield, both of which contribute to higher fidelity.
- **Precise control and flexible gate architecture** - Rigetti has invested heavily in the control technologies underpinning its QPUs. Chip-wide optimization of qubit and tunable coupler frequencies produces fewer unwanted qubit-qubit interactions, and real-time, in-hardware pulse pre-compensation produces gates with lower incoherent errors. Rigetti has also developed a robust calibration process for highly expressive square-root-iSWAP-like gates while solving some of the compilation challenges associated with their practical usage, resulting in an nQA-oriented gate set with significantly lower error rates.

Rigetti's 84-qubit Ankaa-3 system



Ankaa-3 is Rigetti's newest flagship quantum computer featuring an extensive hardware redesign that enables superior performance. Enhancements across the technology stack include a new cryogenic hardware design, an overhaul of the qubit circuit layout, precise qubit frequency targeting with Alternating-Bias Assisted Annealing, and flexible gate architecture with precise controls. Photo Credit: Drew Bird Photography

"With approximately \$225 million of cash, cash equivalents and available for sale investments and no debt, we are extremely confident in our ability to deliver on our roadmap and performance goals. The remarkable performance of Ankaa-3 reinforces our leadership in the superconducting quantum computing field -- which we believe is the winning modality for high-performance quantum computers due to their many advantages, including fast gate speeds and well-established manufacturing processes," says Dr. Subodh Kulkarni, Rigetti CEO.

"Our teams, across the technology stack, work incredibly hard to introduce new, innovative ways to increase our system's performance. As we continue the journey towards fault tolerance, we are constructing computing systems with capabilities that have not been seen before," says David Rivas, Rigetti CTO. "At Rigetti, working closely with our partners, we are committed to finding ways to put those systems to practical use."

Rigetti plans to introduce the next generation of its modular system architecture, while continuing to increase fidelities, in 2025. By mid-year 2025, the Company expects to release a 36-qubit system based on four 9-qubit chips tiled together, with a targeted 2x reduction in error rates from the current level. By the end of 2025, the Company expects to release a system with over 100 qubits with a targeted 2x reduction in error rates from the current level.

### **About Rigetti**

Rigetti is a pioneer in full-stack quantum computing. The Company has operated quantum computers over the cloud since 2017 and serves global enterprise, government, and research clients through its Rigetti Quantum Cloud Services platform. In 2021, Rigetti began selling on-premises quantum computing systems with qubit counts between 24 and 84 qubits, supporting national laboratories and quantum computing centers. Rigetti's 9-qubit Novera™ QPU was introduced in 2023 supporting a broader R&D community with a high-performance, on-premises QPU designed to plug into a customer's existing cryogenic and control systems. The Company's proprietary quantum-classical infrastructure provides high-performance integration with public and private clouds for practical quantum computing. Rigetti has developed the industry's first multi-chip quantum processor for scalable quantum computing systems. The Company designs and manufactures its chips in-house at Fab-1, the industry's first dedicated and integrated quantum device manufacturing facility. Learn more at [www.rigetti.com](http://www.rigetti.com).

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### **Cautionary Language Concerning Forward-Looking Statements**

Certain statements in this communication may be considered "forward-looking statements" within the meaning of the federal securities laws, including expectations with respect to release by mid-year 2025 of a 36-qubit system based on four 9-qubit chips tiled together, with a targeted 2x reduction in error rates from the current level and release of a system with over 100 qubits with a targeted 2x reduction in error rates from the current level by the end of year 2025; our ability to deliver on our roadmap and performance goals and construct computing systems with capabilities that have not been seen before and finding ways to put those systems to practical use and expectations with respect to superconducting being the winning modality for higher performance quantum computing. Forward-looking statements generally relate to future events and can be identified by terminology such as "commit," "may," "should," "could," "might," "plan," "possible," "intend," "strive," "expect," "intend," "will," "estimate," "believe," "predict," "potential," "pursue," "aim," "goal," "outlook," "anticipate," "assume," "demonstrate," "target," or "continue," or the negatives of these terms or variations of them or similar terminology. Such forward-looking statements are subject to risks, uncertainties, and other factors which could cause actual results to differ materially from those expressed or implied by such forward-looking statements. These forward-looking statements are based upon estimates and assumptions that, while considered reasonable by Rigetti and its management, are inherently uncertain. Factors that may cause actual results to differ materially from current expectations include, but are not limited to: the Company's ability to achieve milestones, technological advancements, including with respect to its technology roadmap, help unlock quantum computing, and develop practical applications; the ability of the Company to obtain government contracts successfully and in a timely manner and the availability of government funding; the potential of quantum computing; the ability of the Company to expand its QPU sales; the success of the Company's partnerships and collaborations; the Company's ability to accelerate its development of multiple generations of quantum processors; the outcome of any legal proceedings that may be instituted against the Company or others; the ability to maintain relationships with customers and suppliers and attract and retain management and key employees; changes in applicable laws or regulations; the possibility that the Company may be adversely affected by other economic, business, or competitive factors; the Company's estimates of expenses and profitability; the evolution of the markets in which the Company competes; the ability of the Company to implement its strategic initiatives, expansion plans and continue to innovate its existing services; the expected use of proceeds from the Company's past and future financings or other capital; the sufficiency of the Company's cash resources; unfavorable conditions in the Company's industry, the global economy or global supply chain, including financial and credit market fluctuations and uncertainty, rising inflation and interest rates, disruptions in banking systems, increased costs, international trade relations, political turmoil, natural catastrophes, warfare, and terrorist attacks; the Company's ability to maintain compliance with the continued listing standards of the Nasdaq Capital Market; and other risks and uncertainties set forth in the section entitled "Risk Factors" and "Cautionary Note Regarding Forward-Looking Statements" in the Company's Annual Report on Form 10-K for the year ended December 31, 2023 and Quarterly Report on Form 10-Q for the quarter ended September 30, 2024, and other documents filed by the Company from time to time with the SEC. These filings identify and address other important risks and uncertainties that could cause actual events and results to differ materially from those contained in the forward-looking statements. Forward-looking statements speak only as of the date they are made. Readers are cautioned not to put undue reliance on forward-looking statements, and the Company assumes no obligation and does not intend to update or revise these forward-looking statements other than as required by applicable law. The Company does not give any assurance that it will achieve its expectations.

A photo accompanying this announcement is available at <https://www.globenewswire.com/NewsRoom/AttachmentNg/ec541bde-8376-437d-a751-cbf9029f8d87>