

A next-generation trapped ion quantum computing system

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$^{171}\text{Yb}^+$ qubit

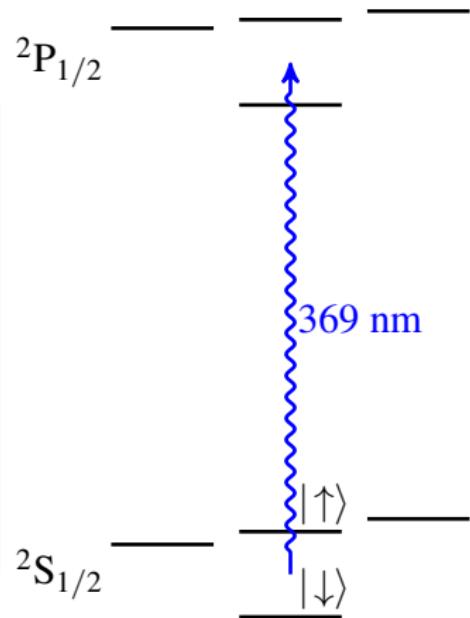
- Long coherence time: $T_2 \approx 1\text{hr}$

Wang, et al., Nat Commun 12, 233 (2021)

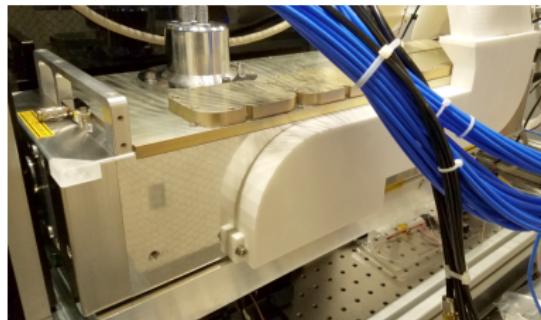
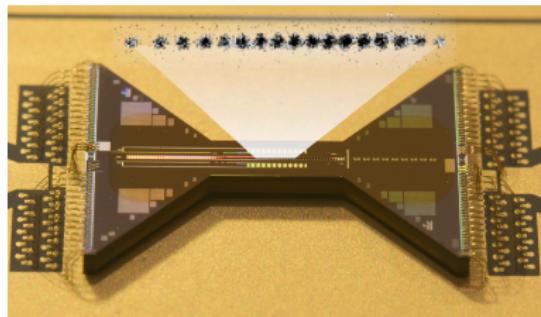
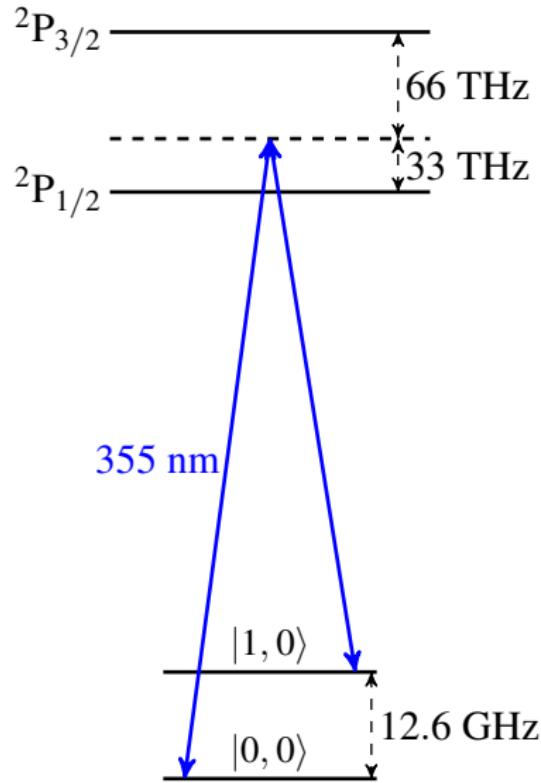
- High fidelity state preparation:
 $> 99.9\%$ in $\approx 10\mu\text{s}$
- High speed and high fidelity readout:
 $> 99.3\%$ in $\approx 100\mu\text{s}$

Harty, et al., PRL. 113, 22051, (2014)

Christensen, et al., NPJ Quantum Inf. 6, 35 (2020)



$^{171}\text{Yb}^+$ chain and coherent manipulation

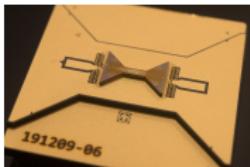


1st generation EURIQA system

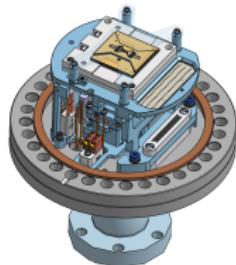


- 15-24 qubits
 - High fidelity single and two qubit gates
 - Universal reconfigurable
 - Remote operations
-
- E06: Programmable N-body interactions with trapped ion qubits
 - E06: Implementing Real-Time Logical Qubit Error Detection & Correction on a Trapped Ion Quantum Computer
 - Q07: Implementation of interactive proofs for quantum advantage on an ion-trap quantum computer
 - U05: Using a trapped ion quantum computer to simulate NMR spectra*

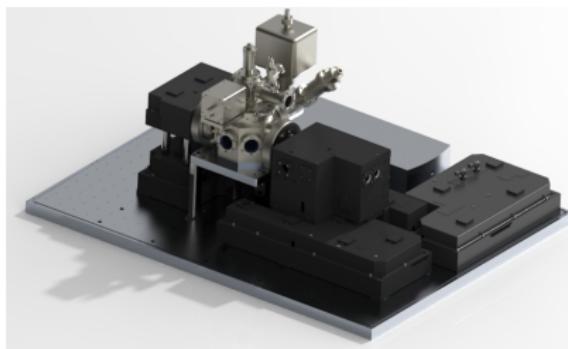
2nd generation EURIQA system



Sandia Phoenix trap



Improved vacuum system



L3Harris Raman beam path



CW lasers

2nd gen EURIQA: Pheonix trap

2nd gen EURIQA: Raman geometry

2nd gen EURIQA: New Yb atom source

2nd gen EURIQA: Improved vacuum

2nd gen EURIQA: Raman beam path

2nd gen EURIQA: CW lasers

2nd gen EURIQA: status and first ion

