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Presentation Type: Oral

Sorting Category: 07.00 Cold atoms, ions, molecules, and plasmas

Sub-Category: 07.04 Trapped Ions

Category Type: Experimental

Title: A next-generation trapped ion quantum computing system

The first generation of a universal trapped ion integrated quantum processor, constructed in a collaboration between our group and industrial partners, was used to perform quantum algorithms with high-fidelity on 13 qubits, and high-fidelity quantum gates with up to 23 qubits.

Abstract Body:

In this work we discuss the progress of commissioning the second-generation trapped-ion universal quantum computer. We present the initial characterization of the system, including the heating rates, coherence times, background collision rate, cross talk and other factors contributing to the gate fidelity. These results showcase the design improvements in the system, such as a new generation micro-fabricated surface ion trap from Sandia National Laboratories, an upgraded Raman optical addressing system built in collaboration with L3Harris, and an improved vacuum system.

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Keyword Label 1	quantum computing
Keyword Label 2	EURIQA
Keyword Label 3	surface trap
Newsworthy Research?	No

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Scroll for More ▿
⇐ Previous
Next ⇒
Page 3 of 5