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QSCOUT: Quantum Scientific Computing Open User Testbed¹ MELISSA C. REVELLE, PETER MAUNZ, ANDREW LANDAHL, MATTHEW G. BLAIN, SUSAN M. CLARK, DANIEL LOBSER, RICHARD MULLER, KEN-NETH M. RUDINGER, CHRISTOPHER G. YALE, Sandia National Laboratories — Trapped ion systems currently offer the highest fidelity single- and two-qubit gates and they admit multiple ways to scale to large processors. Leveraging these advantages, we introduce the Quantum Scientific Computing Open User Testbed (QSCOUT), a trapped-ion testbed laboratory to address the potential of near-term quantum hardware for scientific computing applications. The system being realized at Sandia using our surface ion traps will feature all-to-all connected qubit layouts that can be adapted to different algorithms. QSCOUT provides unrestricted access to the internals of the quantum hardware and enables users to adapt and modify the quantum gates and underlying pulse sequences. We will support and advise users in the functionality of the QSCOUT testbeds, which will allow users to realize the potential of high-fidelity quantum computing

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