

Abstract Submitted
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Microfabricated surface-electrode ion traps for scalable quantum information processing¹ SIGNE SEIDELIN, JOE BRITTON, JOHN CHIAVERINI, RAINER REICHLER, JOHN BOLLINGER, DIDI LEIBFRIED, JANUS WESENBERG, BRAD BLAKESTAD, RYAN EPSTEIN, JASON AMINI, KENTON BROWN, JONATHAN HOME, DAVID HUME, NOBU SHIGA, WAYNE ITANO, JOHN JOST, EMMANUEL KNILL, CHRIS LANGER, ROEE OZERI, DAVID WINELAND, NIST — We confine individual atomic ions in an rf Paul trap with a novel geometry where the electrodes are located in a single plane and the ions confined above this plane [1,2,3]. This device is realized with simple fabrication procedures, making it a potential candidate for a scalable ion trap for quantum information processing using large numbers of ions. We confine laser-cooled ions 40 micrometers above planar electrodes. These electrodes are fabricated from gold on a fused quartz substrate. The heating rate of the ions is low enough to make the trap useful for quantum information processing. [1] J. Chiaverini et al., *Quantum Inf. Comput.* **5**, 419 (2005). [2] S. Seidelin et al., *Phys. Rev. Lett.* **96**, 253003 (2006). [3] J. Britton et al., [quant-ph/0605170](https://arxiv.org/abs/quant-ph/0605170).

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