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Microfabricated surface-electrode ion traps for scalable quantum information processing[1] S. SEIDELIN, J. BRITTON, J. CHIAVERINI, R. REICHLE, J.J. BOLLINGER, D. LEIBFRIED, J.H. WESENBERG, R.B. BLAKESTAD, R.J. EPSTEIN, J.M. AMINI, K.R. BROWN, J.P. HOME, D.B. HUME, W.M. ITANO, J.D. JOST, E. KNILL, C. LANGER[2], R. OZERI[3], N. SHIGA, D.J. WINELAND, Time and frequency division, NIST, Boulder CO, USA
— We confine individual atomic ions in rf Paul traps with a novel geometry where the electrodes are located in a single plane and the ions are confined above this plane [4, 5, 6]. These devices are realized with simple fabrication procedures, making them potentially scalable for quantum information processing using large numbers of ions. For traps fabricated from gold on fused quartz, the ions are 40 micrometers above the planar electrodes and their heating rate is low enough to make the traps useful for quantum information processing.

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