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Multilayer Interconnects for Microfabricated Surface Electrode Ion Traps JASON AMINI, SIGNE SEIDELIN, JANUS WESENBERG, JOE BRITTON, BRAD BLAKESTAD, KENTON BROWN, RYAN EPSTEIN, JONATHAN HOME, JOHN JOST, CHRIS LANGER[1], DIETRICH LEIBFRIED, ROEE OZERI[2], DAVID WINELAND, NIST — Microfabricated surface electrode traps for ions are a promising technology for building scalable trapping geometries for quantum information processing. We have expanded upon our single layer gold-on-fused-silica surface electrode trap [1] to include a second patterned conducting layer under the trapping electrodes and have demonstrated the fabrication of this architecture using standard microfabrication techniques. The multilayer approach allows for a significant increase in multi-zone trapping complexity and permits improved trapping structures that are otherwise unattainable in single layer designs without vertical interconnects through the wafer. Using improved calculational methods [2], we are in the process of optimizing the planar designs to create modular elements that can be joined into larger multi-zone trapping structures. Work supported by DTO and NIST. 1. S. Seidelin *et al.*, Phys. Rev. Lett. **96**, 253003 (2006). Also, see the abstract by S. Seidelin. 2. See the abstract by J. H. Wesenberg.

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