Linear chains in a monolithic symmetric trap for quantum information processing[1] FAYAZ SHAIKH, RICHART SLUSHER, Georgia Tech Research Institute, QUANTUM INFORMATION SYSTEMS TEAM — Linear ion chains are being used [1] to simulate quantum magnet Ising interactions, phase transitions, and spin frustrations. We will present results for trapping linear ion chains in a monolithic two-level trap that utilizes the flexibility, complexity and scalability provided by VLSI silicon microfabrication. This trap provides optimized features and dimensions for trapping equally spaced ion chains while minimizing light scattering and exposed dielectrics that sometimes limit surface electrode ion traps. The ions are trapped symmetrically between two electrode layers. This geometry provides a strong pseudopotential well and radial field symmetry, resulting in stable ion mode frequencies and chains.

[1] K. Kim, et al, Phys. Rev. Lett. 103, 120502 (2009)

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