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A System for Trapping Barium Ions in a Microfabricated Surface Trap[1] ZICHAO ZHOU, JOHN WRIGHT, RICHARD GRAHAM, TOMASZ SAKREJDA, BING CHEN, BORIS BLINOV, University of Washington, MUSIQC TEAM — We have developed a vacuum chamber and control system for rapid testing and development of microfabricated surface traps. Barium ions have been successfully cooled and trapped in this system. The dark lifetime of a single 138Ba+ in this trap is up to 30s. And we can shuttle of ions at rate of 8 cm/s between different potential zones. Our system uses a modular design and is based on an in-vacuum PCB with integrated filters. Control of up to 96 DC electrodes is achieved with an update rate of 20 kHz using a custom FPGA based control system. Collection of fluorescence light over a numerical aperture of 0.28 has been achieved.

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