Abstract Submitted
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Hybrid CMOS/Microfluidic Chip Applications[1] KEITH A. BROWN, DAVID ISSADORE, Harvard University School of Engineering and Applied Science, THOMAS P. HUNT[2], Harvard University Department of Physics, R.M. WESTERVELT, Harvard University School of Engineering and Applied Science, Harvard University Department of Physics — We present our continuing work on hybrid CMOS/microfluidics systems that enable programmable experiments on single biological cells and picoliter chemistry. A 128x256 array of 10x10 micron RF-electrode pixels in the integrated circuit (IC) allows positioning of cell-sized objects using dielectrophoresis in a microfluidic chamber observed using a fluorescence microscope[1]. The fluid environment in the chamber is controlled through external piping, integrating the hybrid chip into a complete microfluidic system. We demonstrate the use of this integrated circuit as a cell-sorting stage. Applications and prototypical experiments with relevance to biologically motivated research will be presented. We highlight single cell experiments made possible by the ability to move, combine and separate picoliter droplets using computer control with video feedback.

[1] Thomas P. Hunt, et al. Lab Chip, 2008, DOI: 10.1039/b710928h

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