

Abstract Submitted  
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**Microfluidic bubble logic and applications**<sup>1</sup> MANU PRAKASH,  
NEIL GERSHENFELD, MIT — We present a novel all-fluidic logic family operating at low Reynolds numbers in newtonian fluids. A bubble in a microfluidic channel represents a bit. Nonlinearities are introduced in an otherwise linear, reversible flow by bubble-bubble interactions. This allows us to simultaneously perform chemistry and process control without external control elements. A toggle flip-flop, AND/OR/NOT gates, ring oscillator and an electro-bubble modulator will be presented. Applications in high-throughput screening and combinatorial chemistry will be highlighted.

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