Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

A microfluidic separation platform using an array of slanted ramps SUMEDH RISBUD, Johns Hopkins University, JORGE BERNATE, Stanford University, GERMAN DRAZER, Rutgers, The State University Of New Jersey — The separation of the different components of a sample is a crucial step in many micro- and nano-fluidic applications, including the detection of infections, the capture of circulating tumor cells, the isolation of proteins, RNA and DNA, to mention but a few. Vector chromatography, in which different species migrate in different directions in a planar microfluidic device thus achieving spatial as well as temporal resolution, offers the promise of high selectivity along with high throughput. In this work, we present a microfluidic vector chromatography platform consisting of slanted ramps in a microfluidic channel for the separation of suspended particles. We construct these ramps using inclined UV lithography, such that the inclined portion of the ramps is upstream. We show that particles of different size displace laterally to a different extent when driven by a flow field over a slanted ramp. The flow close to the ramp reorients along the ramp, causing the size-dependent deflection of the particles. The cumulative effect of an array of these ramps would cause particles of different size to migrate in different directions, thus allowing their passive and continuous separation.

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Date submitted: 09 Nov 2012 Electronic form version 1.4