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Fast Microfluidic Actuation Using Surface Wave Vibrations MING TAN, Monash University, JAMES FRIEND, LESLIE YEO, MicroNanophysics Research Laboratory, Monash University — The propagation of surface waves along a piezoelectric substrate are employed to generate inertial liquid streaming and hence rapid and efficient microfluidic actuation. We demonstrate this mechanism for two cases, namely, an open microfluidic platform and a closed microchannel system. In the first, drops are swept across a hydrophobic track patterned above the substrate. We also show that this is a useful tool for collecting and concentrating microparticles, and in particular biological particles, for biological sampling, detection and analysis, and, environmental monitoring. In the second case, the streaming flow arising from the surface vibrations along the sidewalls of a 30 micron wide and 100 micron deep microchannel is observed to give rise to throughflow with volumetric flowrates of the order 1 microfluidic devices.

James Friend MicroNanophysics Research Laboratory, Monash University

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