Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Transmitting High Power RF Vibration via Fluid Couplants into Superstrates for Microfluidic Actuation[1] JAMES FRIEND, LESLIE YEO, MING TAN, Monash University, MICRONANOPHYSICS RESEARCH LABORATORY TEAM — Surface acoustic wave (SAW) devices provide acoustic radiation to effectively transport fluids and particles within them for applications in microfluidics, yet require the use of piezoelectric substrates with fabrication chemistry incompatible with industry standard silicon and polymer MEMS materials. Here we couple leaky SAW acoustic radiation transmitted along a lithium niobate-based device through a fluid coupling into a thin glass plate. Though simple application of Snell's law would suggest propagation of the acoustic radiation from the couplant into the glass plate is impossible, we demonstrate the radiation's propagation as a Lamb wave to the top surface of the glass plate with sufficient power to transport small fluid droplets at up to 10 mm/s. Further, we illustrate why this occurs with numerical analysis and experimental measurement of the acoustic radiation. This enables the use of standard processing techniques to fabricate an inexpensive and disposable microfluidics device together with the power transmission capabilities of SAW devices with an easily renewable coupling.

[1]Supported by Australian Research Council grants DP0666660 and DP0773221.

James Friend
Monash University

Date submitted: 04 Aug 2008 Electronic form version 1.4