

Self-aligned Interdigitated Transducers for Acoustofluidics

Electronic Supplementary Material

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Supplementary figure S1

A figure of the traveling SAW induced sessile droplet streaming experiment.

Supplementary video S2

A video of the traveling SAW induced sessile droplet streaming experiment. The video is recorded with a high speed camera at frame rate of 2000 frames per second and played at 20 frames per second.

Supplementary figure S3

A figure of the traveling SAW induced sessile droplet streaming experiment at multiple resonant frequencies.

Supplementary video S4

A video of the size-based particle separation in a SSAW field.

Supplementary video S5

A video of the traveling SAW effects in a microfluidic flow focusing system. At 42 and 51.3 MHz, the size of the droplets produced increases at fixed volumetric flow rates. The video is played at 200 frames per second.

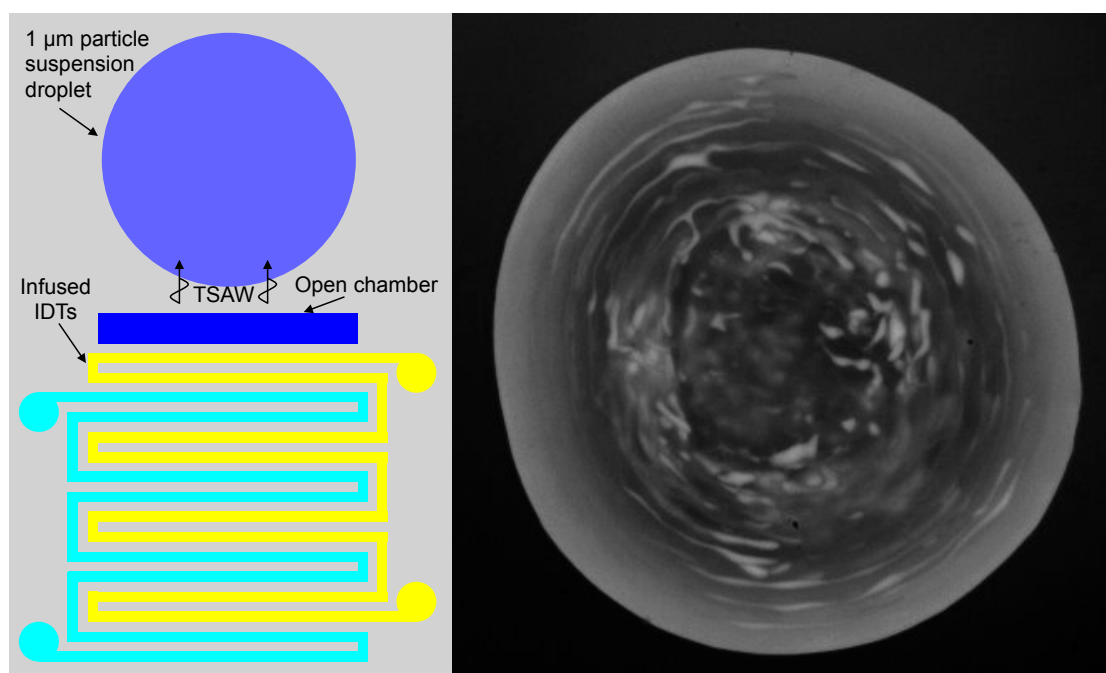


Figure S1 Traveling surface acoustic wave (TSAW) based droplet streaming experiment. A $0.5\ \mu\text{l}$ droplet with $1\ \mu\text{m}$ fluorescent particle suspension is placed in the direction of the traveling SAW generated from the infused interdigital transducers (IDTs). The uneven acoustic pressure distribution induces a streaming vortex within the droplet. Simultaneously, the incident acoustic waves interfere with the reflected acoustic waves from the droplet/air interface, thus forming a standing acoustic field within the droplet. Some of the suspended particles are aggregated to the pressure nodes into a complex pattern. The video of the particle movement and streaming flow pattern in the droplet is shown in the supplementary video S2.

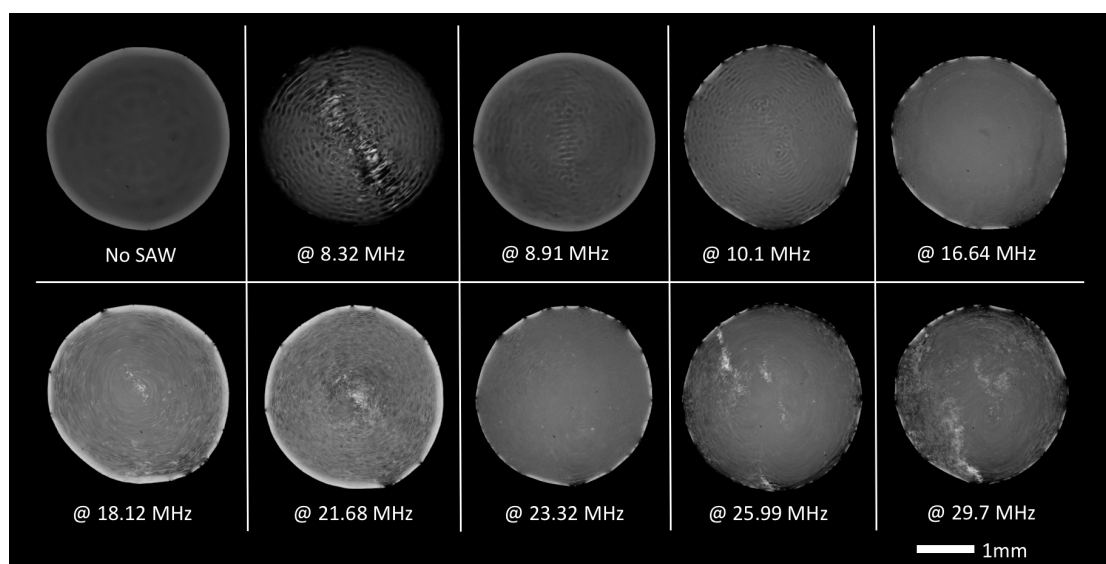


Figure S3 Droplet streaming at different resonance frequencies. 0.5 μ l droplets loaded with 0.02% volume ratio of fluorescent particles (PSF001UM, Magsphere) were pipetted and placed at about 7 mm away from the IDT. Complex standing waves formation and flow patterns were observed at different resonance frequencies. Temperature measurements at various locations show negligible increase when the input voltage is fixed at 200 mV.