Abstract Submitted
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Very long range vortices around microfluidic bubbles under ultrasound[1] PHILIPPE MARMOTTANT, FLORE MEKKI-BERRADA, THOMAS COMBRIAT, PIERRE THIBAULT, CNRS and University of Grenoble, BUBBLEBOOST TEAM — The acoustic vibration of a single bubble results in streaming flows, a non-linear effect that is localized near the bubble, and that is useful to mix and shear fluids in the vicinity only. Here we show that this streaming is much more extended around pair of bubbles because they interact. We perform experiments with flattened microfluidic bubbles, undergoing a volumic vibration mode in response to ultrasound. We observe very long-range recirculating flow around pairs of bubbles. Using a large lattice of these microbubbles, we obtain a unique acoustic bubble pinball driving fluid and particles in complex paths, following elaborate microstreaming vortices. We predict the streamlines to be the consequence of volumic and translational vibration of the bubbles. The translational vibration is the sign of the interaction between bubbles, here mediated by Rayleigh waves on the elastic channel walls. This work, part of the project Bubbleboost, gives a new insight into bubbles efficiency to trigger mixing in laminar flows.

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