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Particle Transport and Size Sorting in Bubble Microstreaming Flow RAQEEB THAMEEM, BHARGAV RALLABANDI, CHENG WANG, SASCHA HILGENFELDT, University of Illinois at Urbana-Champaign — Ultrasonic driving of sessile semicylindrical bubbles results in powerful steady streaming flows that are robust over a wide range of driving frequencies. In a microchannel, this flow field pattern can be fine-tuned to achieve size-sensitive sorting and trapping of particles at scales much smaller than the bubble itself; the sorting mechanism has been successfully described based on simple geometrical considerations. We investigate the sorting process in more detail, both experimentally (using new parameter variations that allow greater control over the sorting) and theoretically (incorporating the device geometry as well as the superimposed channel flow into an asymptotic theory). This results in optimized criteria for size sorting and a theoretical description that closely matches the particle behavior close to the bubble, the crucial region for size sorting.

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