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Measuring ultralow interfacial tensions with magnetic particles in microchannels SCOTT TSAI, University of Toronto, JASON WEXLER, Princeton University, JIANDI WAN, Rochester Institute of Technology, HOWARD STONE, Princeton University — Ultralow interfacial tension solutions have interfacial tensions 1,000 times, or more, smaller than typical oil-water solutions. We describe a technique that measures ultralow interfacial tensions by magnetically deflecting paramagnetic spheres in a co-flow microfluidic device. Our method involves tuning of the distance between the co-flowing interface and the magnetic field source, and observing the behavior of the magnetic particles as they approach the liquid-liquid interface – the particles either pass through or are trapped. We demonstrate the effectiveness of this technique for measuring very low interfacial tensions by testing solutions of different surfactant concentrations, and we show that our results are comparable with measurements made using a spinning drop tensiometer.

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