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Shear induced particle migration in binary colloidal suspensions[1]
DENIS SEMWOGERERE, ERIC R. WEEKS, Emory University, JEFFREY F. MORRIS, City College of New York — We present experimental investigations of the spatial and temporal evolution of particle migration in pressure driven flows of Brownian particle suspensions. Binary suspensions of 1 μm- and 3 μm-diameter colloidal particles at a variety of concentration ratios and volume fractions are pumped through a 50 μm x 500 μm rectangular-cross-section capillary tube. Shear rate gradients caused by the resulting parabolic velocity profile drive particles away from the walls towards the center of the channel where the shear rate is lowest. Size segregation is observed. We measure the development of the size segregation by tracking the evolution of the particle concentration down the center of the tube of the small and large sized particles. The flows are directly imaged using high-speed confocal microscopy (up to 300 images/second).

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