Abstract Submitted
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Colloidal particle dynamics during band assembly[1] ANDREW YEE, MINAMI YODA, Georgia Institute of Technology — Evanescent-wave visualizations have shown that colloidal polystyrene particles in a dilute (volume fractions $< 4 \times 10^{-3}$) suspension assemble into structures called "bands" that only exist near the walls in combined Poiseuille and electroosmotic "counterflow" through silica and polydimethylsiloxane-silica microchannels. These bands have cross-sectional dimensions of a few μm and a length comparable to that of the channel of a few cm. Two-color experiments, where $\sim$1% of the $a \approx 250$ nm particles are tracers labeled with a different fluorophore, are used to investigate particle dynamics over time for a range of flow conditions. In the initial accumulation stage, the near-wall particle concentration increases sharply, and continues to increase after the first band is observed, before decreasing to a roughly constant value with a stable number of "steady-state" bands. Although the particles appear to be in a liquid state within these structures, they do not follow the flow, even before the bands form, and have negligible cross-stream motion. The velocities of near-wall particles within the steady-state bands are found to be much less than those between the bands.

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