Abstract Submitted
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Characterization of self-assembled colloidal particle bands in combined electroosmotic and Poiseuille flow[1] NECMETTIN CEVHERI, MINAMI YODA, Georgia Institute of Technology — Periodic and steady electric fields have long been used to manipulate and assemble colloidal particles suspended in conducting fluids, usually aqueous solutions. Most of these studies have, however, focused on suspensions at rest. Recent studies have shown that a combination of steady electric fields and shear flow can be used to manipulate radii $a = 245$ nm particles in a dilute suspension flowing through ~ 30 μm deep microchannels. When the electric field is in the opposite direction from the Poiseuille flow (which is essentially simple shear flow near the wall), the particles are first attracted to the wall, then self-assemble into nearly periodic concentrated bands aligned with the flow direction, as the electric field magnitude $|E|$ increases. This talk will discuss the characteristics of these bands, *e.g.* how their average spacing depends on $|E|$ and the near-wall shear rate $\dot{\gamma}$, as well as the dynamics of the particles within the bands, which are moving in the same direction as the flow and appear to be in a disordered liquid (*vs.* crystalline) state. Bands only form above a threshold value of $|E|$, and this value depends on parameters such as $\dot{\gamma}$, the particle radius a, and the particle zeta-potential ζ_p.

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