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How particle properties affect the assembly and characteristics of colloidal particle bands[1] MINAMI YODA, ANDREW YEE, Georgia Institute of Technology — The interaction of suspended particles with a planar wall is a classic problem of colloid science. Particle-wall interactions in a flowing suspension are a newer area of interest, motivated by applications in microfluidics. Recent studies show that radius $a = 245$ nm particles in a dilute (volume fraction $\varphi = 0.17\%$) suspension are attracted to the wall, form 1D "pearl chains," then assemble into concentrated streamwise bands with a roughly constant cross-stream spacing in combined Poiseuille and electroosmotic flow through fused-silica microchannels. The bands only exist within a few μm of the wall, and occur above a minimum shear rate $\dot{\gamma}$ and electric field magnitude $|E|$. Attracting (*i.e.*, concentrating) the particles to (near) the wall is a prerequisite for band formation; however, bands are not observed in all cases when particles are attracted to the wall. Particle properties appear to have a significant effect on these phenomena: decreasing φ, for example, appears to increase both the minimum $\dot{\gamma}$ and $|E|$ for band formation. Results are presented on how the assembly and characteristics of the bands are affected by properties such as φ, a (where $a < 1$ μm), and zeta-potential ζ_p.

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