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Effect of flow parameters on assembly of colloidal particle bands in Poiseuille and electroosmotic flow[1] ANDREW YEE, MINAMI YODA, Georgia Institute of Technology — Recent evanescent-wave visualizations (that only image the first ~ 1 μm next to the wall) have shown that dielectric colloidal particles in combined Poiseuille and electroosmotic flow of dilute suspensions through fused-silica channels (with a depth of 34 μm) assemble into streamwise bands. These bands have cross-sectional dimensions of a few μm and length comparable to that of the channel (*i.e.*, a few cm). They are roughly periodic along the cross-stream direction, even though there are no external forces in this direction. For moderate electric fields $|E| < 120$ V/cm, the time scales for band formation at a given channel location appear to scale with the inverse of the shear rate (determined by Poiseuille flow), or $\dot{\gamma}^{-1}$. The results also suggest that the average number of bands N in steady-state (over a field of view of 200 μm square) decreases linearly with increasing $|E|$. These trends are not observed at higher $|E|$ and lower $\dot{\gamma}$, corresponding to cases where $N < 5$. In some cases, a large number of bands appear within a few seconds, then completely "disappear" from the near-wall region, and a much smaller number of bands then re-appear after several seconds.

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