Abstract Submitted
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Separation of nanoparticles by flow past a patterned substrate RUI ZHANG, JOEL KOPLIK, CCNY — We use molecular dynamics simulations to investigate trajectory deflection and particle trapping in flows of nanoparticle suspensions along patterned surfaces. Rigid atomistic particles are suspended in a viscous liquid driven by a pressure gradient through a channel, one side of which has a pattern of alternating stripes which attract or repel the particles. The full wall interaction is obtained by summing over semi-infinite slabs of material with alternating van der Walls interactions, and has a non-trivial three-dimensional spatial variation. This wall interaction can either trap particles on the attractive stripes or deflect the trajectories of mobile particles away from the direction of mean flow. We determine how the motion of particles of different sizes is affected by the wall interactions, and in particular show that trajectory deflection is size dependent and that such flows may be used as a "vector chromotography" separation technique.

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