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Microfluidic migration of soft particles in shear and Poiseuille flow YENG-LONG CHEN, Institute of Physics, Academia Sinica, YA-YU HEW, University of Texas-Arlington — We investigate the migration of deformable particles in shear flow and Poiseuille flow due to the competition between shear forces, particle elasticity, particle diffusion, and particle inertia. At low particle Reynolds number ($Re < 1.0$), the soft particles migrate towards the channel center due to the coupling of particle elasticity and wall-induced hydrodynamic interactions. The competition between the shear forces and particle diffusivity, characterized by the Peclet number Pe, is found to affect whether the particles concentrate in the channel center of in an off-center position. As particle Reynolds number increases to moderate values ($Re \geq 1.0$), the particle concentration profile has two maxima at off-center positions. The migration effect is also found to be enhanced for softer particles with longer elastic relaxation time. The variation of particle concentration profiles leads to non-linear variations of the mixture viscosity and the average flow rate.

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