

Abstract Submitted  
for the DFD19 Meeting of  
The American Physical Society

**Numerical Study of a particle migration in a liquid-liquid stratified flow in a microchannel.** T. KRISHNAVENI, T. RENGANATHAN, S. PUSHPAVANAM, Indian Institute of Technology, Madras — Inertial focusing is a passive separation technique in an axial flow where particles migrate laterally to equilibrium positions in the presence of finite inertia. These equilibrium positions mainly depend on the two counteracting forces namely the wall lift force and the shear gradient force. The equilibrium positions can be altered by changing the velocity profile of the fluid. In this work, we model the inertial focusing of a particle in the laminar, liquid-liquid stratified flow in a microchannel. This is used for the separation and recovery of cells from one fluid to the other without using any membrane. The particle is sent through one fluid and due to the shear gradient force and interfacial force, the particle may focus into the other fluid or stuck at the interface. A flow between infinite parallel plates is considered to study the particle migration. An immersed boundary method coupled with the level set method is used to study the hydrodynamics and the particle dynamics. It is observed that the particle focus in the low viscous fluid beyond a critical flowrate ratio of two liquids. The effect of other parameters like phase holdup, Reynolds number, Weber number, particle size and wettability is analyzed on the particle migration.

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Date submitted: 29 Jul 2019

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