

Abstract Submitted  
for the DFD19 Meeting of  
The American Physical Society

**Cross-stream migration of a particle in a non-isothermal flow in a microchannel using inertial focusing** T. KRISHNAVENI, T. REN-GANATHAN, S. PUS, Indian Institute of Technology, Madras — Cross-stream migration of particles is observed in an axial flow in the presence of finite inertia in inertial focusing. It is a passive separation method where particles migrate to equilibrium positions. These 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, the migration characteristics of a particle in a parallel plate microchannel is studied numerically in a pressure driven flow under the influence of constant temperature gradient in the transverse direction. The viscosity variation in the lateral direction is considered since the fluid viscosity is dependent on the temperature. An immersed boundary method is used to study the particle migration. The particle equilibrium positions depend on the applied temperature gradient. The equilibrium positions are not symmetric since the velocity profile is not symmetric. The effect of temperature gradient, Reynolds number and particle size on the particle migration are analyzed.

T. Krishnaveni  
Indian Institute of Technology, Madras

Date submitted: 02 Aug 2019

Electronic form version 1.4