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Shear- and Thermocapillary-Induced Migration of Bubbles in a Channel[1] BHUSHAN PENDSE, ASGHAR ESMAEELI, Southern Illinois University at Carbondale — Bubbles/drops in the presence of a temperature field occur in many engineering applications. Examples include materials processing, energy generation by liquid/vapor phase change, and microelectromechanical systems (MEMS). In these applications, often a key question is to understand the particle-induced motion and to manipulate the motion of the particles for a better control of fluid flow and heat transfer. A salient feature of these flows is a tendency for bubbles to form short term and/or long term patterns. This will affect the macroscopic behavior of the system, depending on the type of the pattern. In the case of bubbles moving near the wall, the velocity gradient will also influence the motion. To explore the effect of velocity gradient on the pattern formation, we impose a shear force on the thermocapillary-driven suspension of bubbles. We use a front tracking/finite difference method to solve the momentum and energy equations in both fluids. Dynamics of binary- and multi-bubble interactions will be studied as a function of different shear rates. The goal is to understand the mechanism of pattern formation and to quantify the motion using appropriate measures.

[1]ORDA-SIUC

Asghar Esmaeeli
Southern Illinois University at Carbondale

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