

Abstract Submitted  
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**Wall Driven Cavity Approach to Slug Flow Modeling In a Micro channel** AVINASH SAHU, SHEKHAR KULKARNI, SUBRAMANIAM PUSHPAVANAM, Indian Institute of Technology Madras, Chennai Tamil Nadu, India, PROF. PUSHPAVANAM RESEARCH LEAGUE TEAM — Slug flow is a commonly observed stable regime and occurs at relatively low flow rates of the fluids. Wettability of channel decides continuous and discrete phases. In these types of biphasic flows, the fluid – fluid interface acts as a barrier that prohibits species movement across the interface. The flow inside a slug is qualitatively similar to the well known shallow cavity flow. In shallow cavities the flow mimics the “fully developed” internal circulation in slug flows. Another approach to slug flow modeling can be in a moving reference frame. Here the wall boundary moves in the direction opposite to that of the flow, hence induces circulations within the phases which is analogous to the well known Lid Driven Cavity. The two parallel walls are moved in the opposite directions which generate circulation patterns, equivalent to the ones regularly observed in slug flow in micro channels. A fourth order stream function equation is solved using finite difference approach. The flow field obtained using the two approaches will be used to analyze the effect on mass transfer and chemical reactions in the micro channel. The internal circulations and the performance of these systems will be validated experimentally.

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