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**Dynamics of Bubble Rising in Vertical and Inclined Square Channel** LUZ AMAYA-BOWER, City College and Graduate Center of the City University of New York, TAEHUN LEE, City College of the City University of New York
— A stable Lattice Boltzmann Equation (LBE) Model based on the Cahn-Hilliard diffuse interface approach is used to investigate the dynamics of a bubble rising in a vertical and inclined square channel with large density and viscosity ratios. Deformation parameter ($\Delta$) and terminal velocity ($U_t$) of the bubble are interrelated quantities which depend on non-dimensional numbers such as Bond Number (Bo), Morton Number (Mo) and ratio between bubble diameter and channel width ($\kappa$). This study confirms the relationship between $\kappa$ and $\Delta$ and film thickness ($\delta$), as it was reported by previous experimental studies. As $\kappa$ is increased, higher $\Delta$ and smaller $\delta$ are exhibited. This finding is independent of the value of Bo and Mo. In addition, an evaluation was performed for inclined channel to relate the non-dimensional value Froude Number (Fr) and the inclination angle ($\theta$) as function of Bo and Mo. For each set of values of Bo and Mo, there is a critical value of $\theta$ which corresponds to the highest value of Fr, consequently highest $U_t$. This finding is consistent previous simulation and experimental results. This study was performed using a range of Bo and Mo, ($10^{-5} < \text{Mo} < 10^2$) and ($1 < \text{Bo} < 30$), and the inclination of the channel is varied from $0^\circ$ to $75^\circ$.

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