Paper ID: 72040
oral
student

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Fluid and Materials Sciences (2)

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COMPARATIVE STUDY OF BUBBLES ON EARTH AND MICROGRAVITY CONDITIONS FOR TWO-PHASE GAS-LIQUID FLOWS

Abstract

Two-phase flow is a very dense topic in fluid dynamics which is of utmost importance in engineering applications. The most commonly occurring forms of two-phase flows are **gas-liquid flows**. **Bubble formation** in such flows is an undesirable occurrence in many critical systems such as active thermal control systems in space and nuclear reactors, as bubbles may hinder effective heat transfer in these systems. The **collective effect** that these bubbles produce together irrespective of their location in a particular area of the pipe has been analysed by taking the mean of the diameters of all the bubbles in that particular area. This assumption has been considered wherever required. It is essential to study the variation of this parameter with pipe diameter, length, gas velocity, liquid velocity, the density of both the fluids involved etc. since these can give us an insight as to how the bubble size can be controlled. Also, the bubble size variation has been analyzed with time. The **size of bubbles** also differs significantly in microgravity compared to normal gravity. Over the past few decades, there have been an enormous amount of research papers on two phase gas liquid flows which have tried to predict bubble behaviour with highly complex equations. The purpose of this paper is to compare the behavior of bubbles in **two-phase gas-liquid flows** under microgravity and earth gravity conditions using the relation between the above mentioned parameters. Simulations have been carried out varying the above mentioned parameters both in **microgravity** and **normal gravity** environments and the obtained results are discussed. Although many attempts to predict the transition between the gas-liquid flows have been made before, they have been made using highly complex equations. In this paper, an attempt has been made to provide a **simple efficient relation** to understand the transition between these flows.