



**INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS**

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Thesis Title: Experimental and Numerical Investigations of Two-Phase Flow in Confined Channels

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SHORT ABSTRACT

In this study two different problems are studied in confined channels using experimental investigation and computational fluid dynamics (CFD) simulations. The thesis comprises of six chapters and is divided into two parts. The first problem that has been studied is the gas-liquid flow in curved microchannels. Using high-speed camera, the interface evolution and velocity field under different flow regimes has been studied. The important contribution from this study has been accurate measurement of film thickness and development of flow regime maps. There are very limited studies on the measurement of internal velocity field inside a liquid droplet falling in another liquid media. How the internal circulations depend on the location of the droplet from the channel wall has been clearly demonstrated through velocity vector maps. The study of velocity profiles for two coalescing droplets is also reported in this chapter. The evolution of neck width with time has been correctly captured and the results are in good qualitative agreement with the previous investigations. 2D CFD simulations have been performed and the velocity field of single droplet as well as two coalescing droplets have been investigated. The subject area of the investigation is very important from the practical point of view as there are numerous applications of two-phase flow in confined channels.