

Students' Annual Seminar

2D bubbly flows

Rashmi Ramadugu

Bubbly flows are seen in many chemical industries. Earlier works based on experiments [1] and numerical studies [2] showed that in a swarm of buoyant bubbles, the wakes of the interacting bubbles produce large scale structures and the flow field generated exhibits an inverse cascade. Motivated by these studies, we have studied the problem in two different regimes, one in which coalescence/breakup of bubbles is allowed and in the other where it is restricted. We studied the energy spectrum and observed the power laws as $-5/3$ and -3 for inverse cascade and forward cascade respectively. We further investigated if these cascades correspond to the classical 2D turbulence cascades. I will also discuss about the effect of different parameters on the bubbles size distribution.

References:

[1] Bouche, E. and Roig, V. and Risso, F. and Billet, A.-M. Homogeneous swarm of high-Reynolds-number bubbles rising within a thin gap. Part 1. Bubble dynamics *Journal of Fluid Mech.*, 704:211–231, 2012.

[2] G Esmaeeli A, Tryggvason. An inverse energy cascade in 2-dimensional bubbly flow. *Journal of Fluid Mech.*, 314:315–330, 1996

Tuesday, Jun 13th 2017

4:00 PM (Tea/Coffee at 3:45 PM)

Seminar Hall, TCIS