

Abstract Submitted  
for the DFD16 Meeting of  
The American Physical Society

**A single bubble in a turbulent channel flow: Towards understanding drag reduction** RAGHURAMAN N. GOVARDHAN, NARSING KUMAR JHA, Indian Institute of Science — Two phase turbulent flows are ubiquitous in natural systems such as in clouds and oceans, besides in the chemical process industry. There is also interest in such flows from the drag reduction perspective of marine vehicles through the injection of bubbles into the boundary layer. In these flows, the bubbles interact with the turbulent structures present in the flow resulting in complex bubble paths and modification of the structures, the physical mechanisms of which are not well understood. In the present work, we experimentally study the interaction of a single air bubble with turbulent structures in a fully developed horizontal turbulent channel flow. The bubble path is tracked using high speed imaging in two perpendicular planes, while the vortical structures are tracked using time resolved particle image velocimetry (PIV). We observe different bubble paths even at the same incoming flow Reynolds number and bubble size, which is likely related to the interaction of the bubble with the incoming turbulent structures. The effect of bubble size on the bubble motion trajectories and its relation to structures will be presented in the meeting. This simplified study of interaction of a single bubble can help in understanding more complex interaction of multiple bubbles with multi-scale turbulent flows.

Raghuraman N. Govardhan  
Indian Institute of Science

Date submitted: 01 Aug 2016

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