Effects of Weber number on the interaction of single and multiple bubbles with a vortex ring SUBHAJIT BISWAS, RAGHURAMAN N GOVARDHAN, Indian Institute of Science, Bangalore, INDIA — Bubbly turbulent flows are ubiquitous in nature and in such flows, bubbles interact with vortical structures in the flow making the interaction complex. Driven by the motivation to understand these complex interactions, we experimentally study an idealization of this, namely, the interaction of a vortex ring in water with single and multiple air bubble(s). We are interested in the bubble dynamics and in modifications to the ring cores vorticity due to the bubble, the former measured using high speed imaging, and the latter with time-resolved PIV. An important parameter governing this interaction is a Weber number (We), which is defined using the rings circulation and the bubble diameter. Prior results show a significant fragmentation of the vortex core at low We (Narsing & Govardhan, APS 2015). In the present work, we take a step closer to the bubbly turbulent flow case, by investigating the interaction of the ring with more than one bubble. In this multiple bubbles case, the interactions with the ring shows richer dynamics, as seen in the capture of the bubble by the ring, and the bubbles subsequent elongation within the ring. The details of these interactions, including both differences and similarities with the single bubble case, will be presented at the conference.

Subhajit Biswas
Indian Institute of Science, Bangalore, INDIA

Electronic form version 1.4