

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Shapes and paths of an air bubble rising in quiescent liquids PREMLATA AMARNATH RAM, Indian Institute of Technology Hyderabad, DILIN SHARAF, Indian Institute of Technology Hyderabad, India, MANOJ TRIPATHI, Indian Institute of Science Education and Research Bhopal, India, BADARINATH KARRI, KIRTI SAHU, Indian Institute of Technology Hyderabad, India, KIRTI SAHU TEAM — We investigate shapes and paths of an air bubble rising inside a liquid via experiments and direct numerical simulations. Close to three hundred experiments are conducted in order to generate a phase plot in the Gallilei and Eotvos numbers plane. The plot separates distinct regimes, in terms of bubble behavior; specifically, an axisymmetric, skirted, wobbling, and three types of break-up behaviors are observed in our experiments. A wide range of Gallilei and Eotvos numbers is obtained by using aqueous glycerol solutions of different concentrations as the surrounding fluid and by varying the bubble size. The dynamics of the bubbles in each regime is investigated in terms of shapes, topological changes and trajectories followed by the bubbles. The present study complement the numerical simulation results presented by Tripathi et al. (Nature Communications, 2015).

Premlata Amarnath Ram
Indian Institute of Technology Hyderabad

Date submitted: 31 Jul 2017

Electronic form version 1.4