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Bubble collisions with solid/free interfaces MICHAEL BRADY, PAVLOS VLACHOS, DEMETRI TELIONIS, Virginia Tech — The rise of a buoyant bubble and its interaction with solid and free surfaces was experimentally investigated using a combination of shadowgraphs and Laser Induced Fluorescence (LIF). These optical techniques were used to track the bubble position, and measure the velocity field around the bubble in a time resolved manner. The results are quantified as a function of bubble size, and surfactant concentration of the fluid medium. The dominant terms of the force balance for a bubble rising in pure water are buoyancy, Stokes drag, lubrication, and added mass. It is showed that the presence of a surfactant significantly affects the approach and collision characteristics of the bubble. The addition of a surfactant changes the viscous forces around the bubble due to the adsorption coverage of the surfactant at the bubble-fluid interface. Comparisons with other computational and experimental works are combined with the present study to describe the physics of bouncing.

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