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The motion of a bubble sliding against an inclined wall CHRISTOPHE BARBOSA, Universidad Nacional Autonoma de Mexico, DOMINIQUE LEGENDRE, Institut de Mecanique des Fluides de Toulouse, ROBERTO ZENIT, Universidad Nacional Autonoma de Mexico — The motion of a bubble sliding over an inclined wall is studied experimentally for a wide range of liquid properties and bubbles sizes, considering wall inclination angles from nearly horizontal to nearly vertical. All experiments are restricted to sliding behavior, below the transition to steady bouncing motion (Barbosa et al., 2016). We study both the shape of the bubble and its drag coefficient. For small angles, the bubble shape is dominated by gravitational effects resulting in a flattened shape against the wall; for large angles, the bubble remains in constant contact with the wall but adopts a shape similar to that observed for an inertia-dominated free rising bubble. We model this transition of shape considering balances among surface tension, gravitational and inertial forces; we observe good agreement with experiments. We found that the drag coefficient is strongly influenced by the shape that the bubble adopts as it slides over the wall. By considering the flow in the film and around the bubble, we propose an empirical correlation to predict the drag coefficient. The proposed expression agrees well with the experimental measurements.

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