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Bubble formation in planar co-flowing air-water sheets[1] C. GUTIÉRREZ-MONTES, R. BOLAÑOS-JIMÉNEZ, E. SANMIGUEL-ROJAS, C. MARTÍNEZ-BAZÁN, University of Jaen, Spain, A. SEVILLA, University Carlos III of Madrid, Spain — The dynamics of a plane air sheet surrounded by a co-flowing water sheet, discharging into stagnant air, has been investigated by means of experiments and numerical simulations with the aim at proposing new geometrical configurations for air bubble generation. In this case, the problem is governed by the Weber number, $We = \rho_w\, u_w^2\, h_a/\sigma$, and the water-to-air velocity ratio, $\Lambda = u_w/u_a$, being u_w and u_a the mean velocities of the water and air sheets respectively, ρ_w the water density and h_a the half-thickness of the air sheet at the exit. For a fixed liquid-to-gas thickness ratio, $a = h_w/h_a = 5.52$, and a constant Weber number, two different flow regimes have been observed, i.e. a jetting and a bubbling regime. High-speed video images have been used to determine experimentally the transition curve from a jetting regime to a bubbling regime in the $We - \Lambda$ parameter space, as well as to measure several relevant parameters in the bubbling regime, such as the bubbling frequency and the size of the bubbles formed. In addition, direct numerical simulations have been performed by means of the Volume of Fluid technique (VoF), and the results compared with the experimental measurements.

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