Abstract Submitted
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Bubbling in a coflow at high Reynolds numbers[1] A. SEVILLA, Universidad de Jaen, Spain, J.M. GORDILLO, Escuela Superior de Ingenieros, Sevilla, Spain, C. MARTINEZ-BAZAN, Universidad de Jaen, Spain — Bubble formation from a needle in a co-flowing liquid environment is studied in detail by means of experiments and boundary-integral numerical simulations. Two different gas injection systems respectively provide constant flow rate and constant pressure conditions. In both cases, a bubbling period can be divided into an expansion stage, which ends with the appearance of a neck, followed by its collapse. Our experimental and numerical results are in excellent agreement, and suggest that the expansion time can be viewed as the time required for an interfacial wave to propagate distances of the order of the injection needle diameter. Two different mechanisms contribute to the collapse stage: on the one hand, the bubble growth induces an overall decrease in pressure inside the bubble and, on the other hand, the region around the collapsing neck experiences an additional pressure drop caused by the Kelvin-Helmholtz-Rayleigh mechanism. Both experimental and numerical bubbling frequencies under constant pressure conditions are smaller than those corresponding to constant flow conditions, what is explained by means of a simple model. Finally, the density of the gas is shown to modify bubbling frequencies *only under constant pressure conditions*.

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