Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Linear stability of the wake and path of a rising bubble with a realistic shape[1] JOSÉ CARLOS CANO-LOZANO, Universidad de Jaén, JOEL TCHOUFAG, Universite de Toulouse-IMFT, JACQUES MAGNAUDET, CNRS-IMFT, DAVID FABRE, Universite de Toulouse-IMFT, CARLOS MARTÍNEZ-BAZÁN, Universidad de Jaén — A global linear stability analysis of the flow past a bubble rising in still liquid is carried out using the real bubble shape and the terminal velocity obtained for various sets of Galileo (Ga) and Bond (Bo) numbers in axisymmetric simulations performed with the multiphase software Gerris Flow Solver. Once the bubble shape is known, the axisymmetric, steady base flow is computed by means of an iterative Newton method with the finite element software FreeFem++, and the eigenvalue problem is solved with the shift-invert Arnoldi technique implemented in the SLEPc library. The critical curve separating stable and unstable regimes is obtained in the (Ga, Bo) and (Reynolds number, aspect ratio) spaces. This allows us to discuss the effect of the bubble shape and aspect ratio on the wake and path instabilities. We observe that the fore-and-aft asymmetry of the bubble has some influence on the stability since, for a given aspect ratio, bubbles with a realistic shape (i.e. a flatter front and a more rounded rear) are more stable that perfectly spheroidal bubbles.

[1]Supported by the Spanish MINECO, Junta de Andalucía and EU Funds under projects DPI2011-28356-C03-03 and P11-TEP7495.

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Date submitted: 24 Jul 2014 Electronic form version 1.4