ETH zürich

Institute of Fluid Dynamics
Institute of Energy and Process Engineering

Colloquium Thermo- and Fluid Dynamics

Interaction of a rising deformable bubble with a vertical wall

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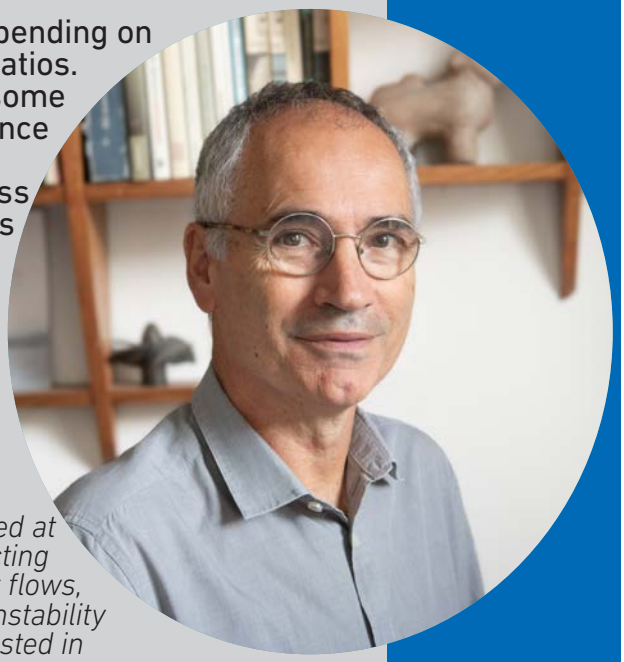
We study numerically the buoyancy-driven motion of a deformable bubble rising near a vertical wall over a wide range of flow regimes.
We identify several different types of near-wall motion, depending on the buoyancy-to-viscous and buoyancy-to-capillary force ratios. Bubbles may either migrate away from the wall, stabilize some distance away from it after some damped oscillations, bounce a few times on the wall before departing from it, or remain trapped near the wall and regularly bounce on it. We discuss the mechanisms underlying these various regimes in terms of wake dynamics, shape variations, and lateral forces acting on the bubble.



Jacques Magnaudet is a senior researcher at CNRS, working at IMFT in Toulouse, France. His research focuses on several aspects of hydrodynamics and turbulence in two-phase flows and inhomogeneous fluids. He has long been fascinated by the complex motion of rigid and deformable objects in fluids, be they particles, drops, bubbles or living organisms. Using or developing asymptotic models, numerical codes and simple experiments, he has contributed at a better understanding and prediction of the hydrodynamic loads acting on these bodies when they move in non-uniform or time-dependent flows, and at elucidating the entangled mechanisms leading to their path instability when their motion is driven by gravity or buoyancy. He is also interested in complex interfacial phenomena resulting from the presence of surfactants, heat or mass transfer, surface tension or viscosity gradients, etc.
He is an associate editor of the Journal of Fluid Mechanics and currently serves as president of the International Union of Theoretical and Applied Mechanics.

Date: Wednesday, 12 March 2025
Time: 16:15 - 17:15 h
Place: ETH Zurich, ML H 44
Host: Prof. Filippo Coletti

Further information: https://ifd.ethz.ch/events/ktf.html

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