Radially forced parametric oscillations of liquid drops

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We consider the problem of a spherical viscous liquid drop subjected to an oscillating radial acceleration surrounded by a gas or liquid of different density and viscosity. The resulting nonlinear behavior is of interest to researchers in pattern formation and dynamical systems as well as having practical application over a wide variety of scales from nanodroplets to astroseismology.

Generalizing the Kumar & Tuckerman [**?**] Floquet solution to a spherical interface, we present a linear stability analysis for the appearance of standing waves. We linearize the governing equations about the state of rest with a poloidal-toroidal decomposition for the internal velocity field, and we decompose deformations of the interface as spherical harmonics $Y_l^m(\theta, \phi)$.

We also carry out full three-dimensional numerical simulations using the parallel 3D two-phase flow code, *BLUE* [**?**], and recover the degree l of the harmonics predicted by the Lamb [**?**] dispersion relation for an ideal drop. We are investigating the behavior in the far nonlinear regime.

Références

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