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Numerical simulation of Faraday waves NICOLAS PERINET, PMMH-ESPCI, DAMIR JURIC, LIMSI-CNRS, LAURETTE TUCKERMAN, PMMH-ESPCI — Faraday[1] first described in 1831 the pattern of standing waves generated at the surface of a vertically oscillated fluid layer; the corresponding linear stability analysis was carried out in 1954 by Benjamin and Ursell[2] for inviscid fluids and in 1994 by Kumar and Tuckerman[3] for viscous fluids. Linear stability analysis, however, predicts only the critical wavenumber and oscillation amplitude, and not the variety of periodic lattice patterns manifested by Faraday waves which have long intrigued researchers. The experimental observation in 1992 of quasicrystalline patterns by Edwards and Fauve[4] has inspired an abundance of experimental and theoretical research. However, this has not been accompanied by realistic numerical computations. Here, we report on fully three-dimensional and nonlinear Navier-Stokes simulations of Faraday waves using a front tracking method for the interface between two immiscible fluids.[5]

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[3]K. Kumar & L.S. Tuckerman, *J. Fluid Mech.* **279**, 49 (1994).
[4]W.S. Edwards & S. Fauve, *J. Fluid Mech.* **278**, 123 (1994).
[5]S. Shin & D. Juric, *J. Comput. Phys.* **180**, 427 (2002).

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