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Faraday instability in deformable domains[1] GIUSEPPE PUCCI, Matières et Systèmes Complexes, Université Paris Diderot, CNRS UMR 7057, 10 rue Alice Domon et Léonie Duquet, 75205 Paris, France, MARTINE BEN AMAR, Laboratoire de Physique Statistique, Ecole Normale Superieure, UPMC Univ Paris 06, Universite Paris Diderot, CNRS, 24 rue Lhomond, 75005 Paris, France, YVES COUDER, Matières et Systèmes Complexes, Université Paris Diderot, CNRS UMR 7057, 10 rue Alice Domon et Léonie Duquet, 75205 Paris, France — We investigate the Faraday instability in floating liquid lenses, as an example of hydrodynamic instability that develops in a domain with flexible boundaries. We show that a mutual adaptation of the instability pattern and the domain shape occurs, as a result of the competition between the wave radiation pressure and the capillary response of the lens border. Two archetypes of behaviour are observed. In the first, stable shapes are obtained experimentally and predicted theoretically as the exact solutions of a Riccati equation, and they result from the equilibrium between wave radiation pressure and capillarity. In the second, the radiation pressure exceeds the capillary response of the lens border and leads to non-equilibrium behaviours, with breaking into smaller domains that have a complex dynamics including spontaneous propagation.

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