ACOUSTICS2008/3270 Experimental confirmation of the theory of acoustic radiation pressure applying on transparent interfaces

Bruno Issenmann[a], Alice Nicolas[b], Regis Wunenburger[a], Sébastien Manneville[c] and Jean-Pierre Delville[a]
[a]Bordeaux University - CPMOH, 351 cours de la Liberation, 33405 Talence Cedex, France
[b]Laboratoire de Physique Matiere Condensee - Univ. Nice, Parc Valrose - 28, avenue Valrose, 06108 Nice Cedex 02, France
[c]Ecole Normale Supérieure de Lyon, 46 allée d'Italie, 69364 Lyon Cedex 07, France

Since Rayleigh and Brilloin, the acoustic radiation pressure has been the subject of several theoretical works, but of few quantitative tests. Whereas the radiation pressure acting on perfectly reflecting or perfectly absorbing solid targets is commonly used for the calibration of high intensity focused ultrasonic beams, it has never been quantitatively studied on acoustically transparent interfaces. Using an acoustically transparent liquid-liquid interface deformed by the radiation pressure of a focused, continuous wave beam, we have tested the theory of the acoustic radiation pressure acting on transparent interfaces for the first time. At large intensity, depending on the direction of propagation of the beam, we observe surprising interface shapes such as drop emitting jets and "nipple-like" deformations.