

Spontaneous oscillations of subsonic liquid bells

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Liquid overhanging and flowing from a continuously fed circular dish can form annular sheets that take the shape of bells. The shape of liquid bells results from a balance between inertia, gravity, capillarity and inner pressure. When the flow-rate is decreased down to a threshold value, spontaneous large-scale oscillations are observed, with typical frequency of a few Hertz. We identify several spatial modes : Planar, Rotational and Axisymmetric and we constitute a diagram of existence by varying both flow-rate and bell inner volume. We measure the frequency and amplitude for different flow-rate and volume, and attempt to propose a mechanism for their origin.

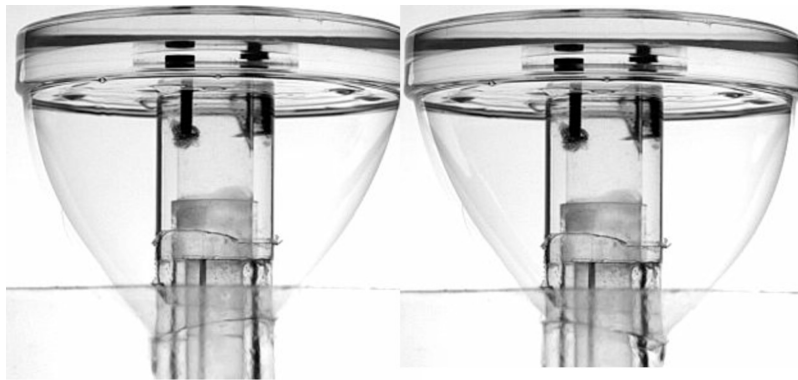


Figure 1. Limit shapes of liquid bells formed by liquid overflowing from a circular dish, oscillating at typical frequency between 2 and 5 Hz.

Références

1. P. BRUNET, C. CLANET AND L. LIMAT, Transonic liquid bells, *Physics of Fluids*, **16**, 2668–2678 (2004).