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**Flapping jets and monodisperse droplets formed by the Kelvin-Helmholtz instability** OLIVER MCRAE, Boston University, ANTOINE GAILLARD, Boston University/Ecole Normale Superieure, JAMES BIRD, Boston University — When a straw is used to blow air into a glass of liquid, typically one of two behaviors is observed: a dimple in the liquid's surface, or a frenzy of waves and bubbles. However, under certain conditions intermediate regimes can develop. In these regimes periodic waves progress into a flapping jet that can develop into monodisperse airborne droplets. The precise mechanism for the formation of these regimes is not well understood. Here we show that the Kelvin-Helmholtz instability is responsible for the formation of the flapping jet. We inject a continuous stream of gas into the liquid surface and observe both optically and acoustically the deformation of the liquid-air interface as we systematically adjust various parameters. Previous research has shown that the frequency of a liquid-gas oscillator can be regulated by the compressibility of the gas phase. Here we present the Kelvin-Helmholtz instability, with the treatment of the fluids as incompressible, as the regulator of the frequency. The formation of the jet droplets can thus be characterized by the Kelvin-Helmholtz and Rayleigh-Plateau instabilities. We anticipate the flapping jet phenomenon could be exploited to create monodisperse aerosols and emulsions, and may be relevant in analogous systems such as pulmonary flow.

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