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Liquids Gone With the Wind

DAVID QUÉRÉ, ESPCI, Paris

Self-propelling fluidic devices naturally result from some asymmetry of wettability, geometry or temperature. Here we consider the case of motions arising from the air around, forced by some trick to flow in an asymmetric way. We first consider vapor flows generated in a Leidenfrost situation, and made anisotropic by textures decorating the hot substrate. We discuss how the force and speed arising from these rectified vapor flows can be optimized. Then, we observe drops on a fiber placed in a symmetric wind. In a well-defined window of wind speed, the drop is found to self-propel along the fiber, which is analyzed. We also show that this effect makes drops moving in opposite direction bounce on each other, which generates fascinating 1-D dynamics.

In collaboration with Guillaume Dupeux, Philippe Bourrianne, Dan Soto, Hélène de Maleprade, Pierre-Brice Bintein, Hadrien Bense and Christophe Clanet.