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Leidenfrost Drop on a Step GUILLAUME LAGUBEAU, MARIE LE MERRER, PMMH-ESPCI, CHRISTOPHE CLANET, Ladhyx-Ecole Polytechnique, DAVID QUERE, PMMH-ESPCI — When deposited on a hot plate, a water droplet evaporates quickly. However, a vapor film appears under the drop above a critical temperature, called Leidenfrost temperature, which insulates the drop from its substrate. Linke & al (2006) reported a spontaneous movement of such a drop, when deposited on a ratchet. We study here the case of a flat substrate decorated with a single micrometric step. The drop is deposited on the lower part of the plate and pushed towards the step at small constant velocity. If the kinetic energy of the drop is sufficient, it can climb up the step. In that case, depending on the substrate temperature, the drop can either be decelerated or accelerated by the step. We try to understand the dynamics of these drops, especially the regime where they accelerate. Taking advantage of this phenomenon, we could then build a multiple-step setup, making it possible for a Leidenfrost drop to climb stairs.

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