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Inverse Leidenfrost effect: self-propelling drops on a bath ANAIS GAUTHIER, DEVARAJ VAN DER MEER, DETLEF LOHSE, University of Twente, PHYSICS OF FLUIDS TEAM — When deposited on very hot solid, volatile drops can levitate over a cushion of vapor, in the so-called Leidenfrost state. This phenomenon can also be observed on a hot bath and similarly to the solid case, drops are very mobile due to the absence of contact with the substrate that sustains them. We discuss here a situation of " inverse Leidenfrost effect " where room-temperature drops levitate on a liquid nitrogen pool - the vapor is generated here by the bath sustaining the relatively hot drop. We show that the drop's movement is not random: the liquid goes across the bath in straight lines, a pattern only disrupted by elastic bouncing on the edges. In addition, the drops are initially self-propelled; first at rest, they accelerate for a few seconds and reach velocities of the order of a few cm/s, before slowing down. We investigate experimentally the parameters that affect their successive acceleration and deceleration, such as the size and nature of the drops and we discuss the origin of this pattern.

Anais Gauthier
Physics of Fluids, University of Twente

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