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**Surfing on a herringbone** DAN SOTO, GUILLAUME LAGUBEAU, CHRISTOPHE CLANET, DAVID QUERE, PMMH/Ladhyx — Liquids in the Leidenfrost state levitate on hot solids, owing to the formation of a cushion of vapor. Without contact, drops glide with negligible friction on their substrate. The conjunction of vapor production and frictionless motion can be exploited to self-propel liquids when placed on hot horizontal ratchets. It was proposed to understand the effect as follows: the asymmetric teeth of the ratchet rectify the vapor flow below the levitating liquid, which is entrained by the viscous vapor. In our presentation, we propose to induce similar effects by geometrical means, hence achieving new designs for self-propelling Leidenfrost liquids. We force a directional flow of vapor by etching a herringbone pattern in the hot substrate. We show how this design can be tuned to optimize the propelling force and the drop speed, which is quantitatively analyzed. We eventually extend these principles to self-propel plastic levitating cards at room temperature, using patterned hockey tables.

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