

Abstract Submitted  
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**Droplet Migration on Contrasting Micro-Striated Surfaces: Vertical Oscillations and Coupled Horizontal Motion**<sup>1</sup> HONGYU ZHAO, DANIEL OREJON, The University of Edinburgh, KHELLIL SEFIANE, The University of Edinburgh; Tianjin University of Commerce, MARTIN SHANAHAN, University of Bordeaux — Hydrophobic, micro-structured solid surfaces comprising structural solid fraction gradients are proposed for liquid droplet spontaneous motion. In this study, we examine, experimentally, the migration of a droplet deposited at the boundary of two micro-striated surfaces comprising different structural solid fractions. Upon being deposited onto the boundary, the vertical oscillatory behaviour of the droplet is observed in addition to the alternate, leading and trailing motion of the contact line, resulting in the horizontal migration of the droplet. To model the vertical oscillatory behaviour of the droplet shape, truncated spheroids featured for different droplet shapes with a flatted region in contact with the solid surface are proposed. The vertical oscillatory behaviour is believed to help the droplet overcome wetting hysteresis. In the modelling approach the vertical droplets oscillating truncated spheroids are then coupled to the alternate contact line motion and to the horizontal migration. A good qualitative and quantitative agreement is achieved when comparing the experimental results with the proposed model.

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