Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Evaporation Driven Droplet Spawning on Microdecorated Surfaces[1] VERONIKA KUBYSHKINA, The University of Edinburgh — The dynamics of solid-liquid interactions are of central importance in numerous scientific endeavours and are especially pertinent to the innovation of sophisticated microfluidic platforms. Emerging fluidic manipulation principles, for example, offer new perspectives on the outstanding challenges in designing microfluidic-based diagnostic and therapeutic technologies. In this work, we reveal an intriguing wetting phenomenon of an evaporating binary liquid, distinguished by the spontaneous formation of droplets from a liquid-imbibed microdecorated surface. Upon deposition, the water-ethanol mixture invades the topographical features, forming a finite (reservoir) droplet bound by a thin liquid film – otherwise known as the hemi-wicking state. Shortly thereafter, additional mini-droplets spontaneously emerge from the liquid film. To explain this atypical behaviour – occurring naturally under ambient conditions – we consider the evolving physicochemical properties of the binary mixture, driven by selective evaporation of the more volatile component. The emerging picture reveals the complex interplay of the underlying principles, allowing us to establish the physical criteria conducive to the formation of spawned droplets.

[1]The author thanks EPSRC for supporting this research through a DPT scholarship.

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Date submitted: 09 Aug 2020 Electronic form version 1.4