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**Self-Propelled Sweeping Removal of Dropwise Condensate on Two-Tier Superhydrophobic Surfaces** JONATHAN BOREYKO, Virginia Tech, XIAOPENG QU, FANGJIE LIU, Duke University, REBECCA AGAPOV, NICKOLAY LAVRIK, SCOTT RETTERER, Oak Ridge National Laboratory, JAMES FENG, University of British Columbia, PATRICK COLLIER, Oak Ridge National Laboratory, CHUAN-HUA CHEN, Duke University, NATURE-INSPIRED FLUIDS AND INTERFACES TEAM, MICROSCALE PHYSICOCHEMICAL HYDRODYNAMICS LABORATORY TEAM, CENTER FOR NANOPHASE MATERIALS SCIENCES TEAM, DEPARTMENT OF MATHEMATICS TEAM — Dropwise condensation can be enhanced by nanostructured superhydrophobic surfaces, on which the condensate drops spontaneously jump upon coalescence. However, the self-propelled jumping in prior reports is mostly perpendicular to the substrate. Here, we propose a substrate design with regularly spaced micropillars. Coalescence on the sidewalls of the micropillars leads to self-propelled jumping in a direction nearly orthogonal to the pillars and therefore parallel to the substrate. This in-plane motion in turn produces sweeping removal of multiple neighboring drops. The spontaneous sweeping mechanism may greatly enhance dropwise condensation in a self-sustained manner.

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