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Capillary rise within superhydrophilic channel JUNGCHUL KIM, Seoul National University, MYOUNG-WOON MOON, Korea Institute of Science and Technology, L. MAHADEVAN, Harvard University, HO-YOUNG KIM, Seoul National University — While the capillary rise within smooth channels is a classical topic in hydrodynamics, the dynamics of liquid rise through superhydrophilic, microscopically rough channels have rarely been studied so far. Here we experimentally show that within superhydrophilic channels, a bulk flow rises against gravity in a similar fashion to one in smooth channels in the initial stages. However, as the bulk approaches Jurin's height, a thin film that wicks into the rough surface emerges, a novel feature characteristic to superhydrophilic capillary rise. We construct a scaling law to explain the wicking rate of the thin film, which depends on the bulk height as well as the surface roughness and liquid properties. This study is potentially useful in understanding transport of sap through porous xylems of plants.

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