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Tunable imbibition dynamics in multiscale porous media OLIVIER VINCENT, THEO TASSIN, ABRAHAM STROOCK, Cornell University — We studied experimentally spontaneous water imbibition in multiscale structures coupling a nanoporous layer to arrays of microcavities of varying aspect ratio. We show that the presence of the microcavities can dramatically affect the dynamics of imbibition, resulting in faster dynamics globally, and in intermittent dynamics locally. We further show that these effects can be tuned not only by the choice of the geometry of the microstructure, but also by changing the filling state of the cavities (air vs. vacuum), which suggests strategies for dynamic control of transport properties.

Olivier Vincent
Cornell University

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