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Imbibition in geometries with axial variations MATHILDE REYSSAT, LAURENT COURBIN, ETIENNE REYSSAT, HOWARD A. STONE, Harvard University - School of Engineering and Applied Sciences — When surface wetting drives liquids to invade porous media or microstructured materials with uniform channels, the penetration distance is known to increase as the square root of time. We demonstrate, experimentally and theoretically, that shape variations of the channel, in the flow direction, modify this "diffusive" response. At short times, the shape variations are not significant and the imbibition is still diffusive. However, at long times, different power law responses occur, and their exponents are uniquely connected to the details of the geometry. Experiments performed with conical tubes clearly show the two theoretical limits.

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