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Anisotropic flow in striped superhydrophobic channels

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We report results of dissipative particle dynamics simulations and develop a semi-analytical theory of an anisotropic flow in a parallel-plate channel with two superhydrophobic striped walls. Our approach is valid for any local slip at the gas sectors and an arbitrary distance between the plates, ranging from a thick to a thin channel. It allows us to optimize area fractions, slip lengths, channel thickness and texture orientation to maximize a transverse flow. Our results may be useful for extracting effective slip tensors from global measurements, such as the permeability of a channel, in experiments or simulations, and may also find applications in passive microfluidic mixing.

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