

Abstract Submitted
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Ratcheting Fluid using Geometric Anisotropy BENJAMIN THIRIA, PMMH-ESPCI, France, JUN ZHANG, Physics Department and Courant Institute, NYU, USA — We discuss a new type of pump that can effectively transport fluids using vibrational motion imposed onto shapes with anisotropy. In our experiment, two asymmetric, sawtooth-like structures are placed facing each other and form a fluid channel. This channel is then forced to open and close periodically. Under symmetric, reciprocal motion, fluid fills in the gap during the expansion phase of the channel and is then forced out during contraction. Since the fluid experiences different impedance when it takes different directions in the gap, the stagnation point that separates flows of two directions changes within one driving period. As a result, fluid is transported or pumped from one end of the gap to the other. This ratcheting effect of fluid is demonstrated through our measurements and its working principle is discussed in some detail. We also discuss the potential applications of this vibratory fluid pump.

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