

Abstract Submitted
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Levitation and locomotion on an air-table of plates with heringbone grooves JOHN HINCH, HELENE DE MALEPRADE, DAMTP-CMS, Cambridge University — Recent experiments in ESPCI in Paris and numerical simulations in Nano- and Microfluidics in Darmstadt have shown that plates with heringbone grooves in their base are accelerated on an air-table in the direction that the chevron grooves point. A simple two-dimensional model is constructed of the air flow down a channel with pressure controlled influx across the lower boundary. Limiting cases are considered of low and high Reynolds numbers, and of small and large pressure drop down the channel compared with the pressure drop across the porous plate. The levitation and locomotion forces are calculated. A prediction is made for the locomotive acceleration which avoids the complications of the shorter grooves which exit the front and back edges.

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