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Reversibility in a Contact Line¹ JEANETTE SMIT, BRIAN KROGER, AIDAN MCGUCKIN, ALFREDO MEDINA, NATHAN KEIM, Cal Poly - San Luis Obispo — When a liquid spreads over a solid surface, it forms an irregular border between the liquid and the air called a contact line. If this contact line is repeatedly driven back and forth through small displacements, its shape may eventually self-organize so that the motion becomes reversible. We have designed and built an apparatus to study this reversibility. A syringe pump injects and withdraws water repeatedly with a set volume amplitude in a quasi-2D acrylic cell. A camera is used to measure how much the contact line changes in each cycle. Our preliminary data shows evidence of self-organization in the system, indicated by a transient period of irreversibility followed by a steady state. When the amplitude is changed, we observe another irreversible transient, suggesting that the system may form a specific memory of driving. We discuss methods of experimentation and the results of further experiments to test for memory.

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