

Abstract Submitted
for the FWS19 Meeting of
The American Physical Society

Memory in a Contact Line¹ ESMERALDA OROZCO, CHARITY LIZARDO, AUDREY PROFETA, NATHAN KEIM, Department of Physics, California Polytechnic State University — We investigate whether cyclically driving a liquid-solid-vapor contact line can encode memory. We use a syringe pump to infuse and withdraw a set volume of water in a narrow gap between the two glass plates. This allows for the shape of the contact line to change each time the system is driven. To analyze the evolution of the contact line, we take photos after each cycle. Comparing each subsequent image to each other, we find that the contact line may become reversible, so that its shape stops changing. This behavior is seen even at high volumes. This motivated the search for memory behavior in the contact line. We train the contact line with a certain volume to reach a steady state. This establishes a memory of the training volume that allows the steady state to be recovered by applying the training volume at a later time. This memory is erased by applying larger volumes, but not smaller volumes. These behaviors are reminiscent of return-point memory, best known in ferromagnets. Our results indicate memory exists, and that the trained volume can be stored as retrievable information in the contact line.

¹NSF grant DMR-1708870

Esmeralda Orozco
Department of Physics, California Polytechnic State University

Date submitted: 27 Sep 2019

Electronic form version 1.4