

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Dynamics of the electro-osmotically toggled droplet switch DOMINIK BARZ, Forschungszentrum Karlsruhe GmbH, IKET, D-76021 Karlsruhe, Germany, MICHAEL VOGEL, PAUL STEEN, Cornell University, School of Chemical & Biomolecular Engineering, Ithaca NY 14853, USA, EODS COLLABORATION — A capillary switch is a bi-stable system of liquid/gas interfaces with a trigger to toggle back and forth between the energy wells. The electro-osmotic droplet switch consists of a pair of coupled droplets whose shape-change is triggered by volume transfer using an electro-osmotic pump placed between the droplets. With the pump off, the stable states are a pair of identical sub-hemispherical drops for low total-volume or a large-small droplet configuration (two mirror-symmetric states) for large enough total-volume. With the pump on, these stationary states are shifted or there are no stationary states at all, depending on the pump strength. We report the pump-on behavior as a modification of the pump-off behavior. A dynamic model of the system which adopts an Ergun-equation characterization of the pump is introduced. Model predictions are compared to observation.

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Date submitted: 07 Aug 2009

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