

Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Dynamic behavior of electrowetting-based liquid prisms JAE-BUM PARK, JONGHYUN HA, Seoul National University, KYUHWAN CHOI, JUNGMOK BAE, HO-YOUNG KIM, Samsung Advanced Institute of Technology — A liquid prism is an optofluidic device consisting of two immiscible liquids, whose interface acts as a refractive surface. To steer a light beam that constructs optical images, the interface profile, or the contact angle, is modulated via electrowetting on dielectric (EWOD). Alternating current (AC) voltages are used for liquid prisms to stably maintain a desired contact angle without charge saturation in general. However, minute oscillations at the contact line are observed due to rapid changes of voltages under AC conditions, which may propagate into the interface leading to the deterioration of the optical quality. Here we find that the oscillation behavior is strongly correlated with the type of electrolytes, so that the solutions of small ions are more vulnerable to oscillations. We give an empirical relationship of the oscillation amplitude to the AC frequency, and theoretically analyze the salient features of the electrowetting-driven interface motion.

Jaebum Park
Seoul National University

Date submitted: 20 Aug 2013

Electronic form version 1.4