

Abstract Submitted  
for the DFD06 Meeting of  
The American Physical Society

**A Criterion on Splitting a Micro Air Bubble Squeezed Between Two Solid Plates**<sup>1</sup> SUNG CHO, YUEJUN ZHAO, University of Pittsburgh — An air bubble sandwiched between two channel plates can be split into two daughter bubbles by switching the wettability in the middle of bubble base area in contact with the plates. Here the wettability switch can be easily achieved by applying an electrical potential to the electrode underneath the bubble contacting base surface, so called electrowetting-on-dielectric (EWOD) principle. However, it is found that there is a criterion that makes splitting possible only in certain conditions. For complete splitting, smaller channel gap, larger bubble size, wider splitting electrode and/or larger contact angle change by EWOD are preferred. This criterion is derived by a static analysis based on the static equilibrium condition and geometrical relations, and verified by a series of experiments using microfabricated testing devices.

<sup>1</sup>Supported by the NSF (ECS) and SITE (Swanson Institute for Technical Excellence).

Sung Cho  
University of Pittsburgh

Date submitted: 07 Aug 2006

Electronic form version 1.4