Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

**Control of capillary flow by shape perturbation** MARTIN HELLER, MATHIAS BÆKBO ANDERSEN, RUNE BARNKOB, HENRIK BRUUS, Technical University of Denmark, MIC – Department of Micro and Nanotechnology — Capillary forces offer the possibility to transport and guide liquids in microfluidic systems without active pumps. The position of the meniscus in a capillary flow can be precisely predicted in straight channels with constant cross-section. However, most chip designs require complex channel geometries, which can be achieved using accurate microfabrication techniques. We present analytical results based on first-order shape-perturbation theory for the position of an advancing liquid/gas interface in a flat microchannel with nonparallel confining boundaries. We propose to use such systems with carefully designed height variations for guided capillary filling and for avoiding trapping of air bubbles during priming of lab-on-a-chip devices.

Martin Heller
Technical University of Denmark, MIC
Department of Micro and Nanotechnology

Date submitted: 24 Sep 2007 Electronic form version 1.4