

Abstract Submitted  
for the DFD07 Meeting of  
The American Physical Society

**STM-Controlled Capillary Based Non-Contact Fluid Deposition Nanolithography**<sup>1</sup> ARTUR LUTFURAKHMANOV, ROB SAILER, DOUG SCHULZ, ISKANDER AKHATOV, North Dakota State University — A new method of fluid deposition based on scanning tunneling microscopy (STM) is presented. STM-Controlled Capillary Based Non-Contact Fluid Deposition Nanolithography consists of a Au-coated glass nanocapillary tip integrated into a commercial STM scanner platform where the tip serves the dual purpose of imaging and deposition. The small diameter hollow fiber (O.D. less than 500 nm) coupled with a conducting coating allows sub-angstrom-level z-resolution imaging using standard STM methodology. For fluid deposition, the tip is first located within 10 nm of the substrate before the nanocapillary is pressurized with a fluid ( $P = 50\text{-}500$  KPa) leading to the formation of a small meniscus that then interacts with the underlying surface to give small spot of fluid deposition. Initial results show the ability to form features less than 500 nm in diameter using alpha-terpineol as the model fluid and highly-oriented pyrolytic graphite as the substrate. In addition to non-contact deposition, this technology also allows non-contact imaging using the constant height STM mode thereby eliminating the difficulties associated with finding nanometer-sized features.

<sup>1</sup>Authors acknowledge support from NSF-EPSCoR and ND-EPSCoR.

Artur Lutfurakhmanov  
North Dakota State University

Date submitted: 02 Aug 2007

Electronic form version 1.4