

Abstract Submitted  
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**Coaxial and Triaxial Atomic Force Microscope Probes for Nanoassembly** KEITH A. BROWN, JONATHAN AGUILAR, R.M. WESTERVELT, Harvard SEAS and Physics — We present a technique for the controlled three dimensional assembly of nanoscale objects using a modified atomic force microscope (AFM) probe. A conducting AFM probe is coated with alternating insulating and metal layers then etched at the tip to expose coaxial electrodes. The fabrication allows freedom to specify the size of the tip and therefore the length scale of objects to manipulate. An RF voltage is applied to the electrodes to trap objects at the tip with dielectrophoresis (DEP). The object may be released when it has been moved to the desired location by turning off the field. We present a two electrode coaxial configuration capable of positive DEP and a three electrode triaxial configuration for negative DEP which holds the trapped object away from the tip to overcome the "sticky finger" problem. The integration of three dimensional assembly with the nanometer precision and force-imaging capability of an AFM creates a platform for imaging and constructing structures at the nanoscale. We describe initial experiments and fabrication.

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