Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

**DNA templating for *in situ* growth and measurement of 1D superconducting wires** LIUQI YU, JINGJIAO GUAN, PENG XIONG, Florida State University — Controllable and reproducible fabrication of sub-10 nm metal wires is of broad scientific and technological interest. One notable example is nanowires of disordered superconductors; such a small width is generally required to place them in the 1D regime where questions remain on the nature of superconductivity and superconducting fluctuations. Molecular templating based on macromolecules, such as carbon nanotubes and DNA strands, offers a relatively straightforward and reliable method of producing nm-wide wires. Here, we report the fabrication of nanowire templates using a unique procedure of DNA stretching.[1] DNA wires are assembled onto $Si/SiO_2/Si_3N_4$ substrates across trenches with an overhang, fabricated via e-beam lithography and combination of dry and wet etching. The location and orientation of the DNA wires can be well controlled. The template will be used as the substrate for *in situ* growth and electrical measurement of 1D superconductor nanowires in a custom dilution refrigerator. The experiments are expected to enable a close examination of the emergence and evolution of superconductivity in true 1D limit as the wire cross-section is varied in situ on one and the same sample.

[1]J.J. Guan *et al*, Adv. Mater. 19, 1212 (2007).

Liuqi Yu
Florida State University

Date submitted: 13 Dec 2011 Electronic form version 1.4