

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Design of a 20 mK/15 T STM system**<sup>1</sup> YOUNG JAE SONG, STEVE BLANKENSHIP, JASON CRAIN, JOSEPH STROSCIO, National Institute of Standards and Technology — We describe the design of a versatile ultra-high vacuum (UHV) STM system capable of ultra low temperatures ( $\sim 20$  mK) and high magnetic fields (15 T). A bakeable UHV dilution refrigerator (DR) was designed adopting a Joule-Thomson He3 condenser for low-noise closed-cycle operation, while maintaining the option of a traditionally pumped 1 K pot. The entire STM module can be transferred from an upper room temperature chamber, where the sample and tip are easily exchanged, into the DR in UHV. The sample holder has five isolated electrical contacts which are also used for kinematic mounting of the sample. This allows 4 probe electrical measurements to be performed simultaneously with STM measurements for microscopic transport studies. To achieve a stable environment, we use 3 stages of vibration isolation with a combination of active and passive feedback loops. Current progress will be discussed in relation to design goals.

<sup>1</sup>This work is supported in part by the Office of Naval Research and Korea Research Foundation.

Young Jae Song  
National Institute of Standards and Technology

Date submitted: 21 Nov 2006

Electronic form version 1.4