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UHV LT-STM system with Sample and Tip Exchange MICHAEL DREYER, Lab for Physical Sciences, Dept. of Electrical and Computer Engineering, University of Maryland, JONGHEE LEE, HUI WANG, DAN SULLIVAN, Lab for Physical Sciences, Dept. of Physics, University of Maryland, BARRY BARKER, Lab for Physical Sciences, National Security Agency — We developed and built a low temperature scanning tunneling microscope system with ultra high vacuum sample and tip preparation capabilities. The STM is mounted inside an UHV can which is submerged in a He bath cryostat. The cryostat is equipped with two superconducting magnets allowing a maximum in plane field of 2 T and a maximum out of plane field of 9 T. The two fields can be combined to a 1 T vector field. The vacuum can is connected to an UHV system at room temperature consisting of two chambers: One dedicated to transferring samples and tips to the STM, and the other chamber used for tip/sample preparation. It is equipped with two electron beam evaporators, an argon ion sputter gun as well as sample heaters. The whole system is supported by an optical table to decouple the STM from building vibrations. The system was successfully used to study standing electron waves on gold (111) as well as vortices on NbSe2. Details of the microscope, sample and tip handling system, as well as the UHV system will be presented.

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