

# $^3\text{He}$ LT UHV SPM with SC Magnet

## USM1300

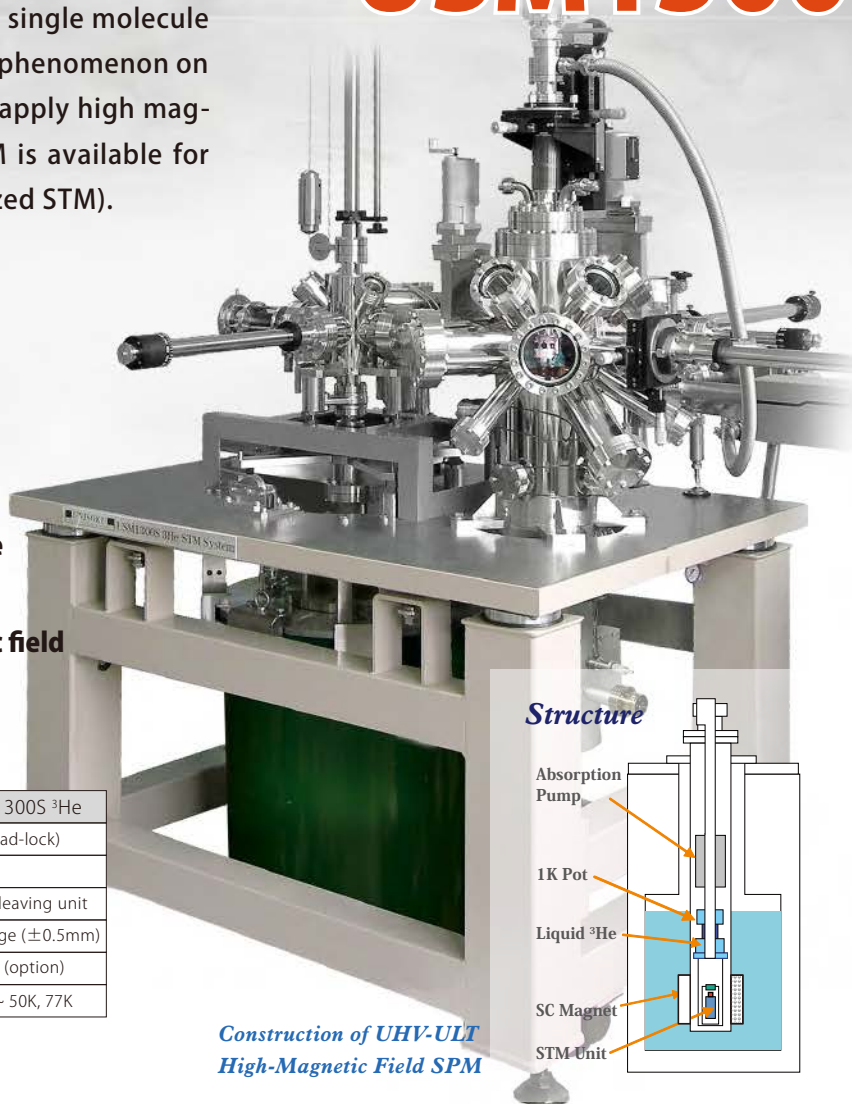
This system is designed for stable STM at ultra low temperature. This system is suitable for the spectroscopy on single molecule (IETS) and useful for the observation of various phenomenon on surface at low temperature. Moreover you can apply high magnetic field during STM measurement. This STM is available for spin analysis of magnetic material (Spin-polarized STM).

### Applications

- Spectroscopy on single molecule (IETS)
- LDOS mapping on surface
- Spin polarized STM
- Measurement of electric state in ground state
- Observation of structure in ground state
- Observation of electric state in high magnetic field

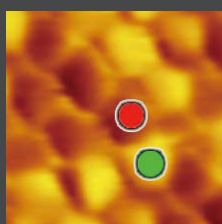
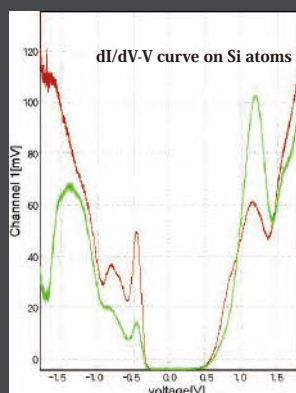
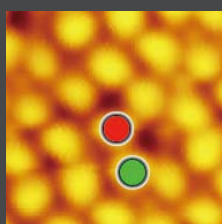
### Line up of USM1300 series

	USM1300S $^4\text{He}$	USM1300S $^4\text{He}$ VTI	USM1300S $^3\text{He}$
Chamber	4 chambers system (Insert, Exchange, Preparation, Load-lock)		
Vacuum System	Below $3.0 \times 10^{-8}$ Pa (Exchange, Preparation)		
Additional Option	E-beam heating of sample and tip, Ar Ion Gun, Cooling cleaving unit		
Scanner	X Y: $2\mu\text{m}/0.6\mu\text{m}$ , Z: $0.3\mu\text{m}/0.08\mu\text{m}$ (RT/4.2K) Coarse X Y stage ( $\pm 0.5\text{mm}$ )		
Magnetic Field	Vertical direction to sample surface, 7T (standard) 11T (option)		
Temperature	4.2K, 77K	2K ~ 50K, 77K	0.4K ~ 50K, 77K



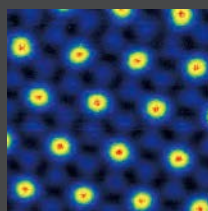
Construction of UHV-ULT High-Magnetic Field SPM

### LDOS mapping on Si (111), 4.2K, 7T



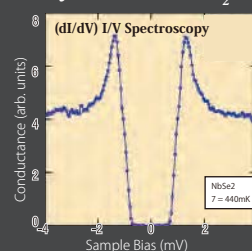
a: Topo image  
Sample bias 2.1V Tunnel current 1.24nA  
b: dI/dV image  
Sample bias 1.2V Tunnel current 1.24nA

### STM Image of vortex lattice of a superconductor NbSe<sub>2</sub>



Measurement conditions:  
Temperature: 400mK  
Magnetic Field: 0.5T  
Environment: UHV  
Field of View: 250nm x 250nm

### STM Image and STS data of Cleaved NbSe<sub>2</sub>



Measurement Conditions:  
Temperature: 440mK  
Field of View: 7.3nm x 7.3nm

Both image and data are from Dr. Hanaguri in Magnetic Materials Laboratory, RIKEN

Instrumental components are subject to change without prior notice for improvement in performance.

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