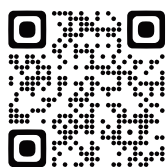
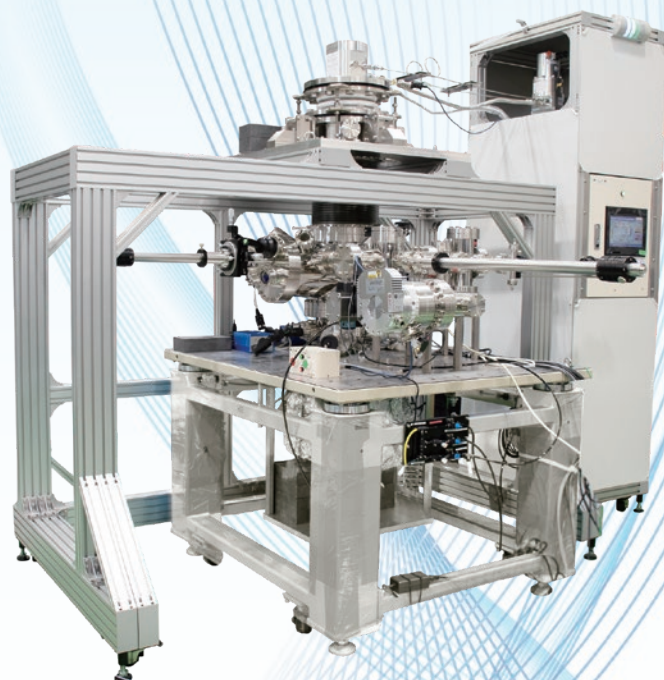


# USM1800

The closed-cycle USM1800 LT UHV SPM is now part of the UNISOKU SPM product family! The USM1800 provides sample temperatures below 6K, and the cryogen-free cooling system achieves ultimate SPM performance at low temperature while allowing interruption-free measurement conditions.



USM1800 Web site



## Features

- Sample temperature below 6K (when optical window shielding is closed)
- State-of-the-art SPM platform with atomic resolution imaging (qPlus AFM is available as an option)
- Optical access and in-situ deposition capabilities (inertial-driven lens stages on the SPM platform are available as an option)
- The sample holder is available in either the conventional bayonet type or the flag type.

## Applications

- Replacement of a liquid-helium-based low-temperature SPM system
- Observation of quasi-particle interference patterns by tunneling spectral mapping
- Observation of surface adsorption structure using in-situ deposition capabilities
- Studies of photo-induced phenomenon in combination with simultaneous SPM measurements

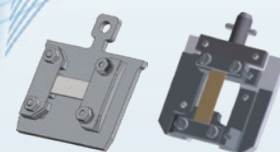
Specifications	
SPM structure	Tip scanning type Coarse positioning for X,Y (Φ 1 mm) and Z (5 mm)
Scan range	1μm x 1μm at 6K
Sample holder	Bayonet style holder, Flag style holder (Direct Current, Electron bombardment, Cleaving)
Temperature	< 6K Pulse tube refrigerator maintenance every 1.5 yr
Options	Internal optical lens stages with 3D coarse positioning (NA~0.25) Tuning Fork NC-AFM
Chamber structure	Includes SPM observation chamber, preparation chamber, and loadlock chamber. In-situ UHV sample/probe holder transfers

Laboratory Requirements	
Recommended laboratory area	Floor space: 4m x 4m Ceiling height: >2.8m
Floor vibration level	<1μm/s (rms) below 5Hz <3μm/s between 5-10Hz 5μm/s above 10Hz
Preparation of equipment	Cooling water Three-phase electric power

### Sample holder

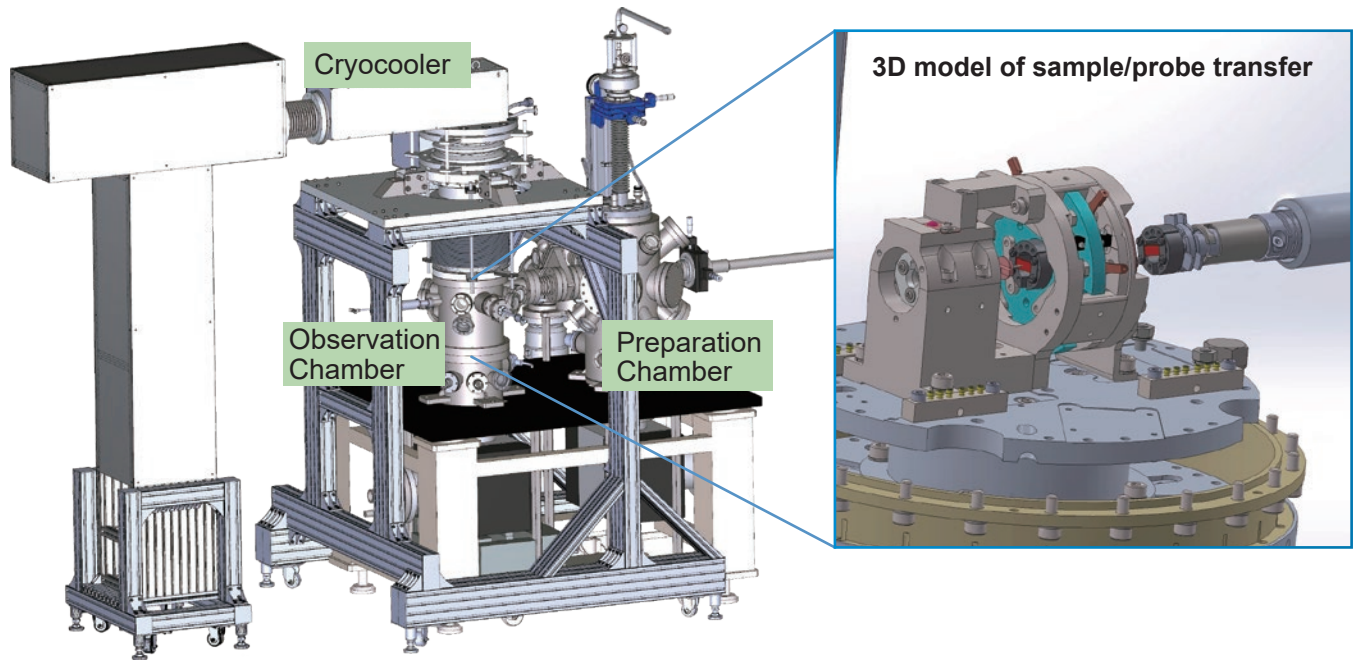


Bayonet style holder



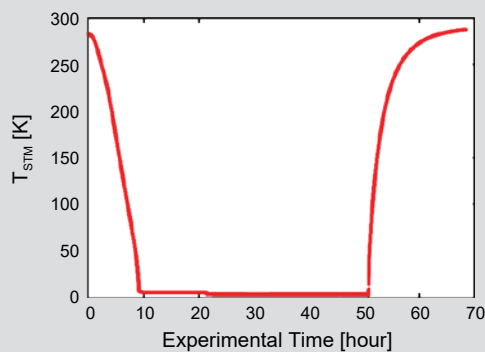
Flag style holder

# Schematic view of the USM1800 system

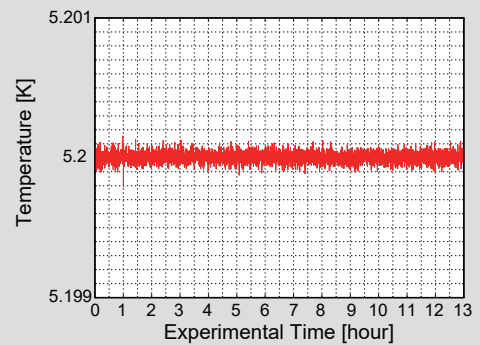


## Cooling performance

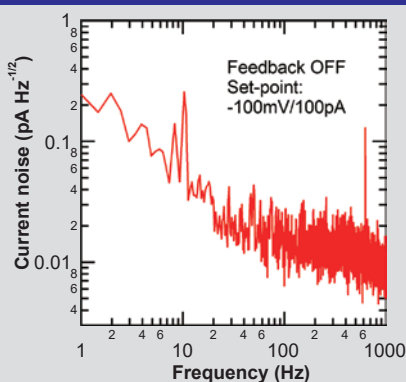
System cooling time: RT to <6K in 24 hours



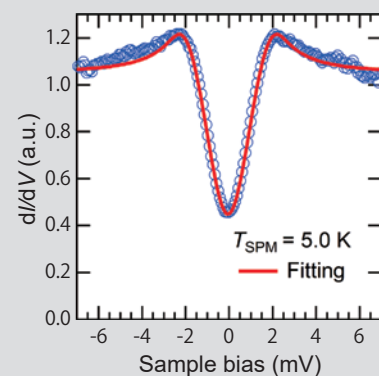
Temperature stability @ 5.2K



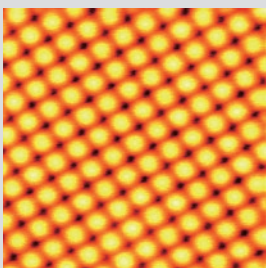
## Tunneling current noise spectrum



## Superconducting gap of Pb

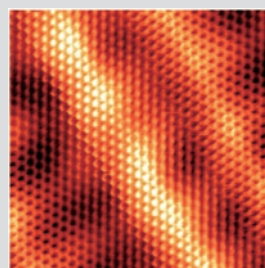


## Nc-AFM NaCl atomic image at 6K



Sample: NaCl (100)  
AFM sensor: q-Plus  
amplitude: 200pm  
Frequency shift: -13Hz

## STM Au(111) atomic image at 5.6K



Scan size 7nm x 7nm  
Bias voltage +5mV,  
Tunnel current 1nA