

STREAM SPM LAB Flow Cryostat UHV SPM



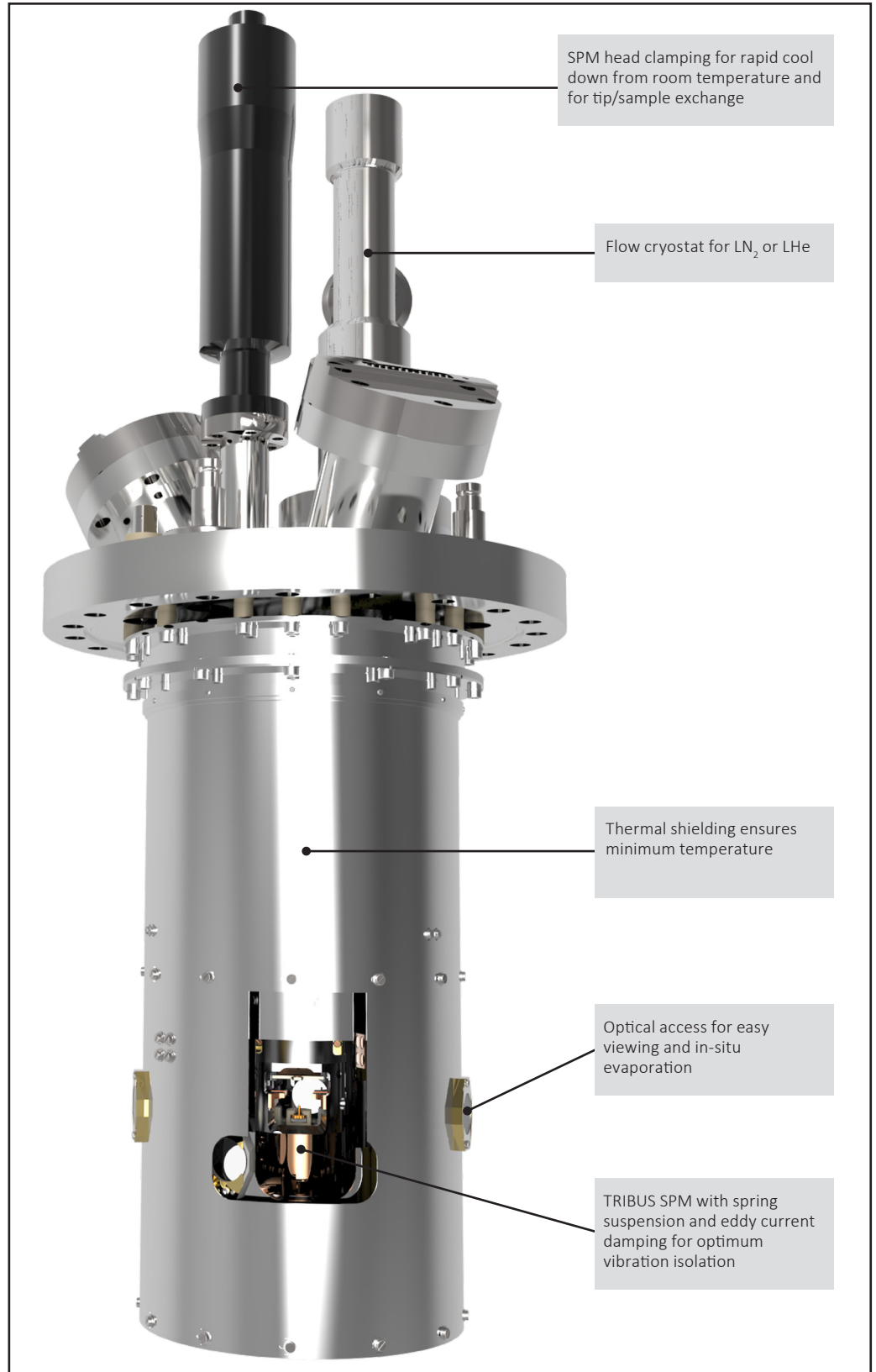
- STM, QPlus® AFM & Spectroscopy
- 3D Coarse Motion
- Temperature: < 10 K to 420 K
- Flow Cryostat for LN₂ & LHe
- Cold Sample and Tip

The STREAM SPM

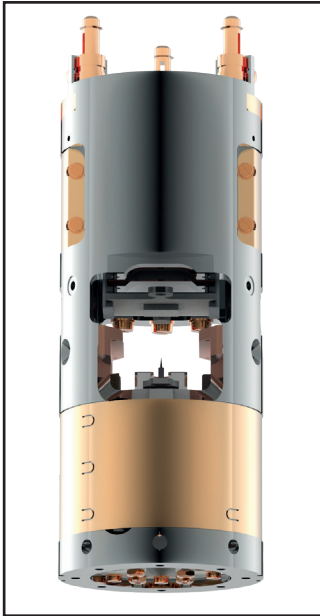
The STREAM UHV SPM combines advantages of a cost-effective low-temperature flow cryostat platform with the attractive features of the TRIBUS SPM head including 3D coarse motion, high intrinsic stability, easy tip and sample exchange, and optical access.

The STREAM SPM platform is purpose-built for high resolution STM, QPlus® AFM, and spectroscopy experiments in a temperature range between < 10 K and 420 K. With the integrated thermal shield compartment, the cryostat enables operation using either LHe (< 10 K) or LN₂ (< 100 K) under stable conditions. The efficient thermal shielding delivers low liquid helium consumption and high temperature stability resulting in low thermal drift.

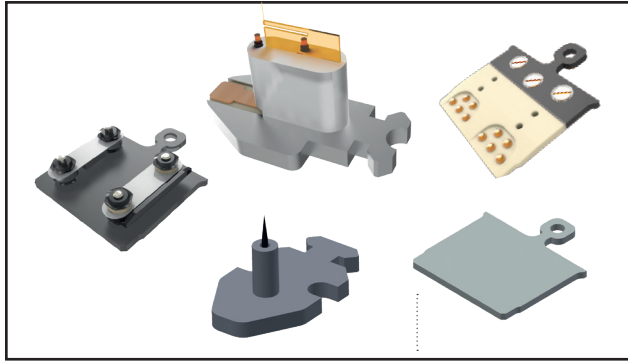
The STREAM SPM is integrated into an very compact vacuum system. This modular assembly is available as a stand-alone unit or as a bolt-on option for integration into larger SPM multi-chamber UHV systems.



A Rigid, Modular and Compact Research System



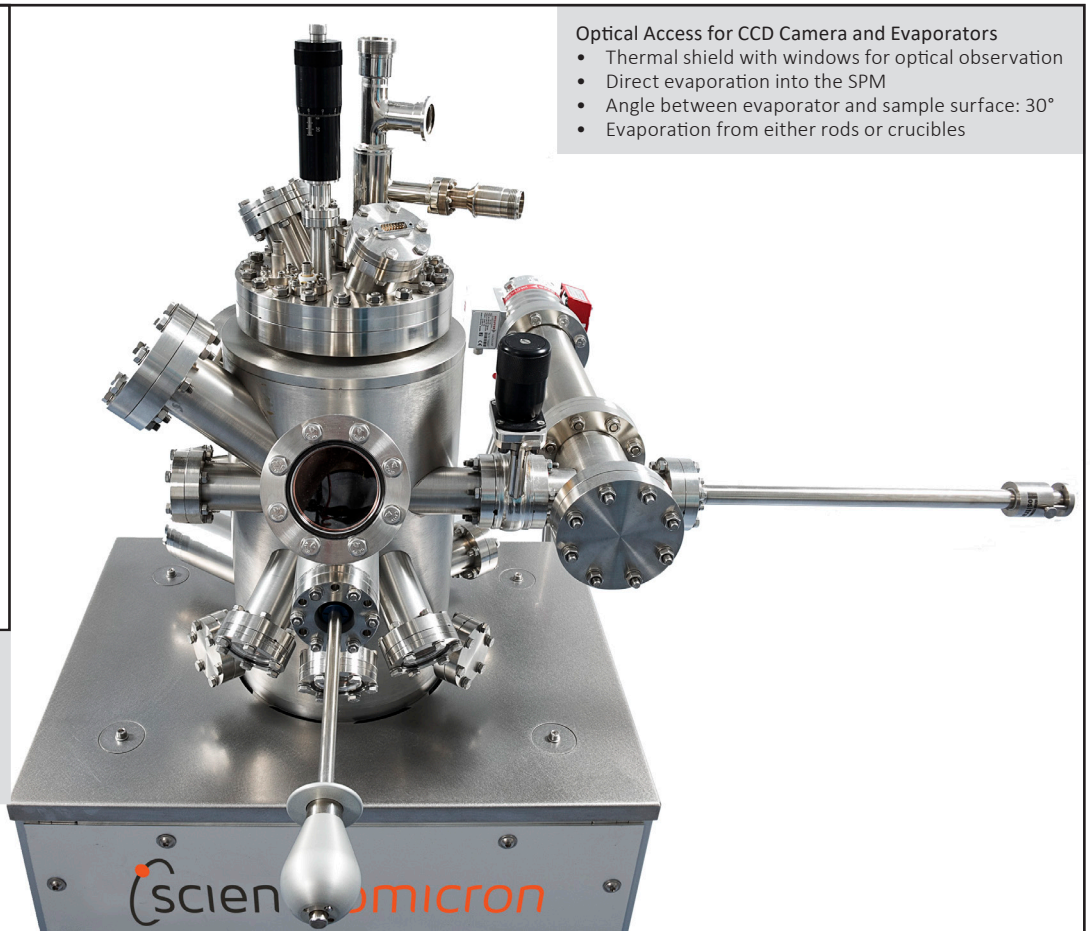
The STREAM SPM employs the TRIBUS SPM head with 3D coarse motion for tip/sample, high intrinsic stability, easy tip and sample exchange, and optical access. For more information on the TRIBUS head, please see the relevant technical information available.



- Sensors and Samples**
- In-situ tip/sample exchange via wobble stick
 - Secure tip/sample handling
 - QPlus® sensors and STM tip carriers
 - Standard flag style sample plates:
 - For metal single crystals
 - For direct current heating (Si samples)
 - Sample plates with tapped holes
 - Various materials available
 - Sample plate with 4+1 & 10+1 electrical contacts
 - TVS sample plates for variable temperature operation

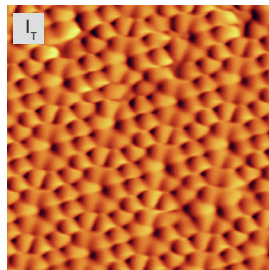
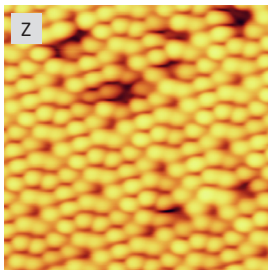


- The STREAM bolt-on option includes :
- the SPM UHV chamber
 - a sample storage carousel with 20 positions for tips and samples
 - a wobble stick for easy tip and sample transfer

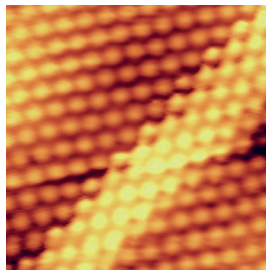


- Optical Access for CCD Camera and Evaporators**
- Thermal shield with windows for optical observation
 - Direct evaporation into the SPM
 - Angle between evaporator and sample surface: 30°
 - Evaporation from either rods or crucibles

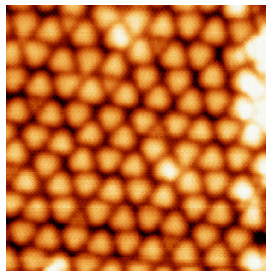
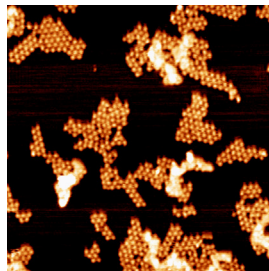
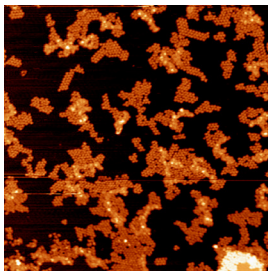
The STREAM SPM Lab is an exceptionally compact vacuum system, designed for limited laboratory space.



STM topography (left) and corresponding tunnelling current signal (right) measured on Si(111) at T = 6.34 K



Au (111) at 10 K (STM)



Sub-monolayer of HHTP molecules evaporated onto a Cu(111); STREAM operated in STM mode with LN₂ at T = 79 K (scan ranges: 100 nm x 100 nm (left), 50 nm x 50 nm (middle) and 10 nm x 10 nm (right))
Data Courtesy of Carlos Sanchez, Martin Gago and Johann Coraux et al., Madrid, SPAIN, Chem. Sci.; DOI: 10.1039/d0sc04883f (2021)



All results are obtained with the STREAM SPM in combination with the SXM Controller. For more information on the SXM Controller, please see the relevant technical information available.

Technical Data

STREAM SPM Lab

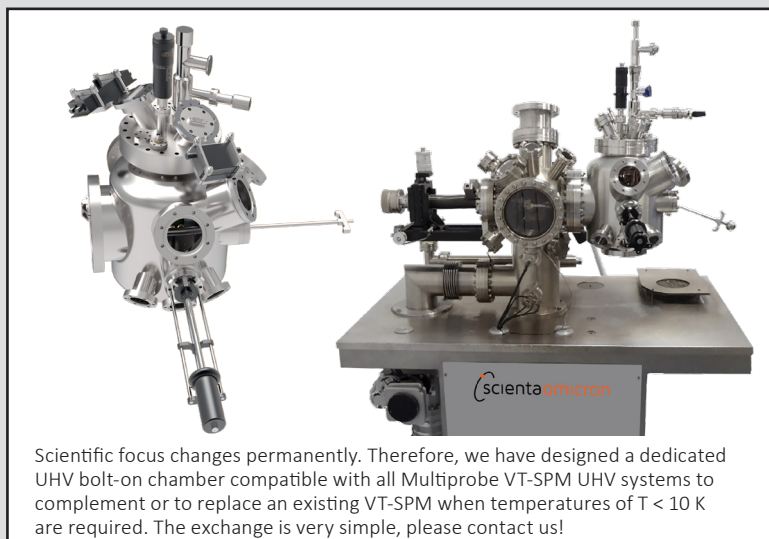
SPM head	TRIBUS SPM
Cryostat	Flow Cryostat
Temperature range	< 10 K - 300 K or 420 K (with TVS plate)
Min. temperature	typ. < 9 K (LHe cooling) typ. < 81 K (LN ₂ cooling)
Cryogen consumption	5 l LN ₂ per 24 h at T < 85 K 0.7 l LHe per hour at T < 10 K
Cool down time	< 40 min. from 85 K to < 10 K
Access ports for	CDD camera, light, evaporators, in-situ tip/sample exchange
SPM modes	STM, QPlus® AFM and related spectroscopy
SPM specifications STM:	atomic resolution on Au(111) at T < 10 K QPlus®: atomic resolution on NaCl or Si(111) 7x7 at T < 10 K

Options:

- QPlus® AFM operation
- 4 or 10 additional sample contacts
- STM tip preparation tool
- Customised preparation chamber

SPM Measurement Modes:

- STM, STS, I(V), dl/dU, df/dz
- IETS
- Spin-polarised STM and STS
- QPlus® AFM, df(z), df(U)
- Atom, molecule and nanoparticle manipulation



Scientific focus changes permanently. Therefore, we have designed a dedicated UHV bolt-on chamber compatible with all Multiprobe VT-SPM UHV systems to complement or to replace an existing VT-SPM when temperatures of T < 10 K are required. The exchange is very simple, please contact us!

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