

# TRIBUS

## Compact UHV SPM

STM, AFM & Spectroscopy

Excellent Stability

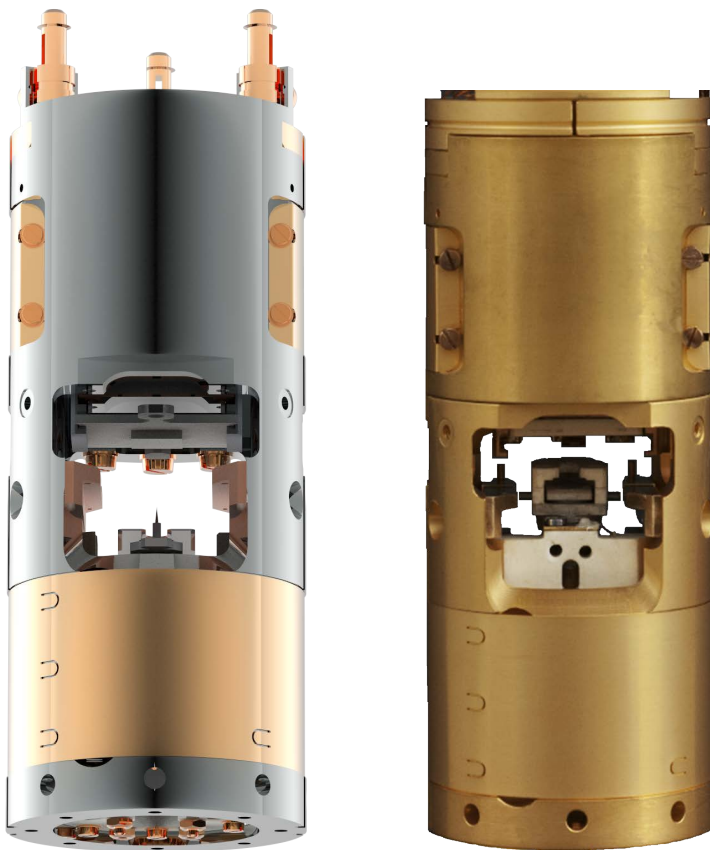
Orthogonal 3D Coarse Motion

Independent Tip & Sample Exchange

Easy Handling

Low-Temperature Compatibility

Non-Magnetic Design



# The TRIBUS SPM

The ultra-compact SIGMA TRIBUS is an SPM head for a wide variety of applications. Whether for **SPM-spectroscopy**, **surface imaging**, or **manipulation of nanoparticles**, for **experiments at elevated temperatures**, or at the **millikelvin scale**, in **high magnetic fields** or in **spatially tight environments**, the TRIBUS head is the ideal solution when highest resolution, accuracy and flexibility are required.

## TRIBUS Character

Integration into almost every UHV environment is possible due to its small footprint, non-magnetic materials, and compatibility with a wide temperature range.

Special attention was paid to the selection and pre-characterisation of materials for the TRIBUS head. As a result, it has a minimal thermal drift and optimum stiffness, which yields excellent stability in the SPM.

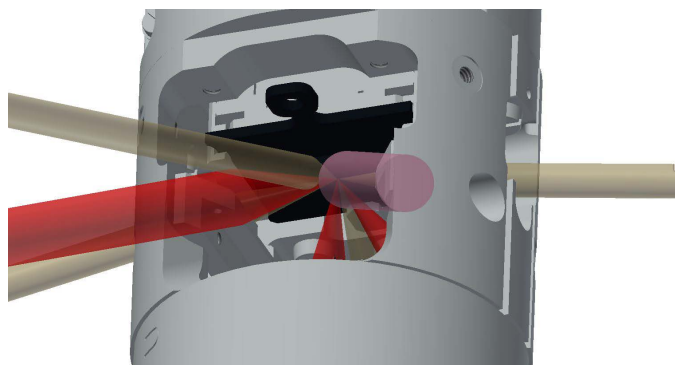
Aspects such as 3D coarse motors with independent and orthogonal axes, and easy and safe in-situ tip and sample exchange, facilitate ease of daily work. Additional features such as multiple electrical sample contacts and optical access ports extend the possible applications beyond standard SPM measurements.

There are two variants of the TRIBUS: an ultra-low temperature head for temperatures down to mK range and high magnetic fields (>2T) and a head variant for temperatures above 1.1K and magnetic fields of <2T.



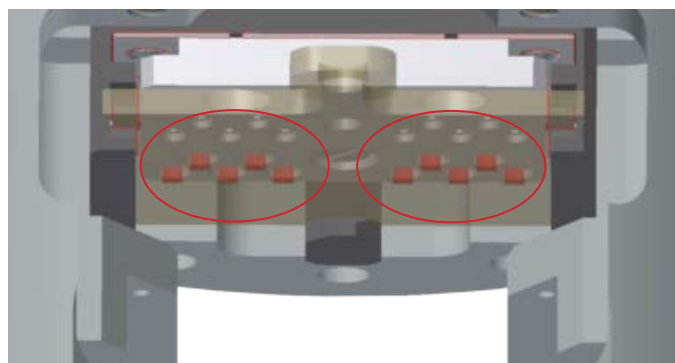
## Optical Access

Multiple access ports for in-situ evaporation, optical observation/illumination, and in-situ tip and sample exchange.



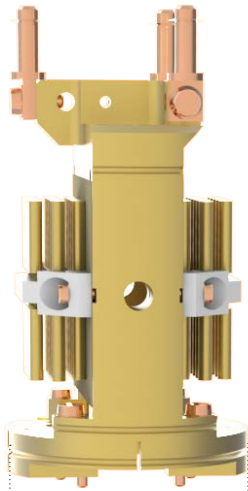
## Multiple Sample Contacts

In addition to the standard sample contact, the sample acceptor stage carries up to 10 electrical contacts.

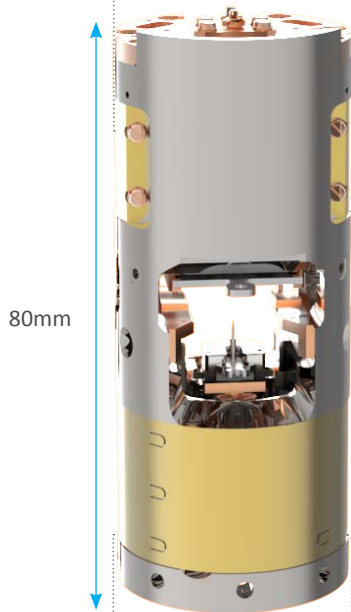


Sample acceptor stage equipped with 10 additional electrical contacts (shown in red).

## ...The Compact UHV SPM Head



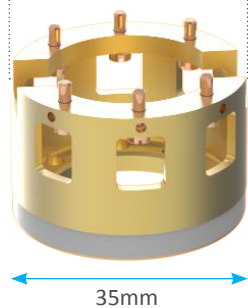
Adapter for spring suspension and/or connector terminal; optional according to experimental requirements.



### SPM Measurement Head

Compact footprint: h=80mm and  $\varnothing=35$ mm.

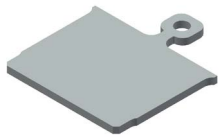
- Piezo tube scanner (scanning tip).
- 3D coarse positioning:
  - 2D horizontal sample movement.
  - Vertical movement of tip and scanner.
- Tip and sample at same temperature.
- Excellent signal shielding.



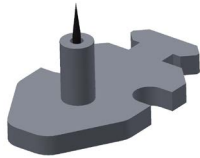
Optional second adapter for integration of heater and/or touch control detectors.

# Further Information

## Tip Carriers and Sample Plates



Standard sample plate (various materials available).



Cost effective metal tip carriers (consumable); various materials available.



Sample plate with multiple electrical contacts.



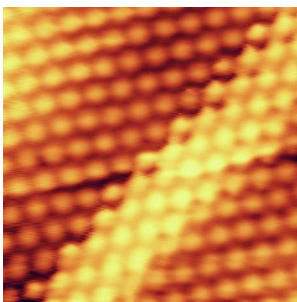
Direct current sample plate e.g. for Si sample preparation.

More sample plates, sensors, and carriers are available.

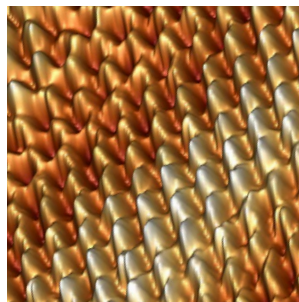
## Typical Applications:

STM, STS, qPlus®, I(V), dl/dU, dl/dz, IETS, atom/molecule/nanoparticle manipulation, df(z), df(U), SP-STM,...

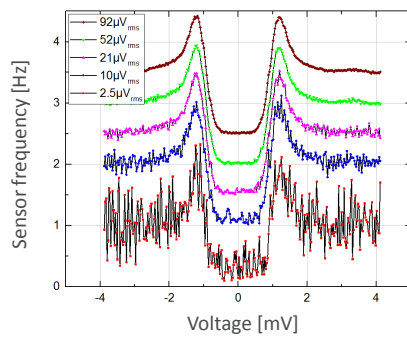
## Measurement Results



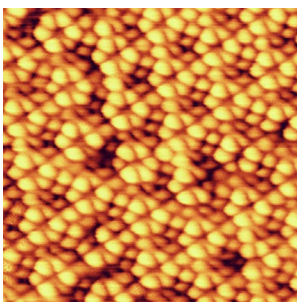
STM image of Au(111) at 10K (measured with SIGMA STREAM SPM system)



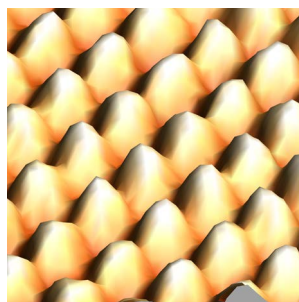
STM image of Au(111) at  $T \approx 600$  mK (integrated in  $^3\text{He}$  Magnet Cryostat UHV System)



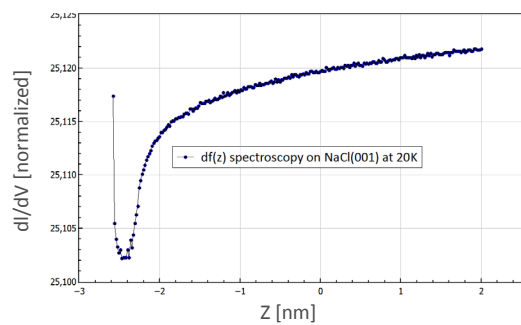
dl/dV spectroscopy on NbSe<sub>2</sub> at  $T \approx 400$  mK (integrated in  $^3\text{He}$  Magnet Cryostat UHV system)



qPlus AFM image of Si(111) 7x7 at approximately 20K



qPlus AFM image of single crystal NaCl(001) at approximately 20K



qPlus AFM df(z) spectroscopy on single crystal NaCl(001) at approximately 20K

For further information please contact:  
sales@mantis-sigma.com



[www.sigma-surface-science.com](http://www.sigma-surface-science.com)