

- ***Atomic Resolution***
- ***Visual Access***
- ***Fast Tip And Sample Exchange***
- ***Uses Standard AFM Cantilevers***

DME
Ultra High Vacuum SPM

DME
Danish Micro Engineering A/S
DME NanoTechnologie GmbH

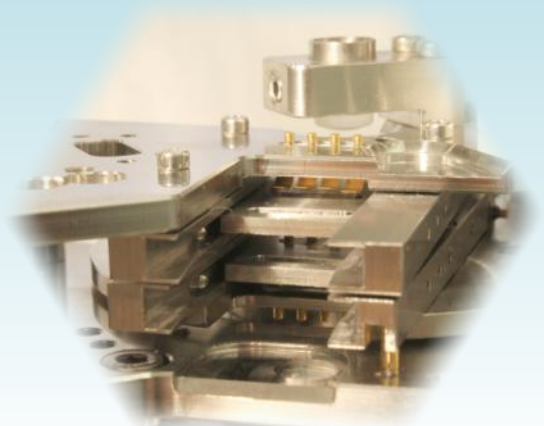
Standard AFM comfort in UHV environment

In high-end research AFM, performance and flexibility are the top design criteria. Common UHV SPMs are very specialized and far behind the ease of use of today's standard AFMs or SPMs.

With the DME UHV SPM, we bring flexibility and usability into ultra high vacuum applications: Use the **variety of standard AFM cantilevers** for your UHV experiments and jump over the limitation of necessity for specialized tips. Obtain **highest physically possible resolved images**. The new Anchored Stage™ technology enables coarse movement between SPM tip and sample without any negative influence on system stability. With a **mechanical loop of no more than 3 cm**, you obtain the best possible **single atomic resolution**.

DME has united the demand for **ultimate performance with so far unknown level of handling comfort** in the field of UHV SPM systems.

A **remote controlled laser/detector alignment** combined with a **single linear transfer for sample and cantilever** exchange supports extreme easy handling and highest throughput. Encapsulated laser and detector electronics guarantee **low noise and reliable detection** of the cantilever deflection. The approved RasterScope™ sample scanner



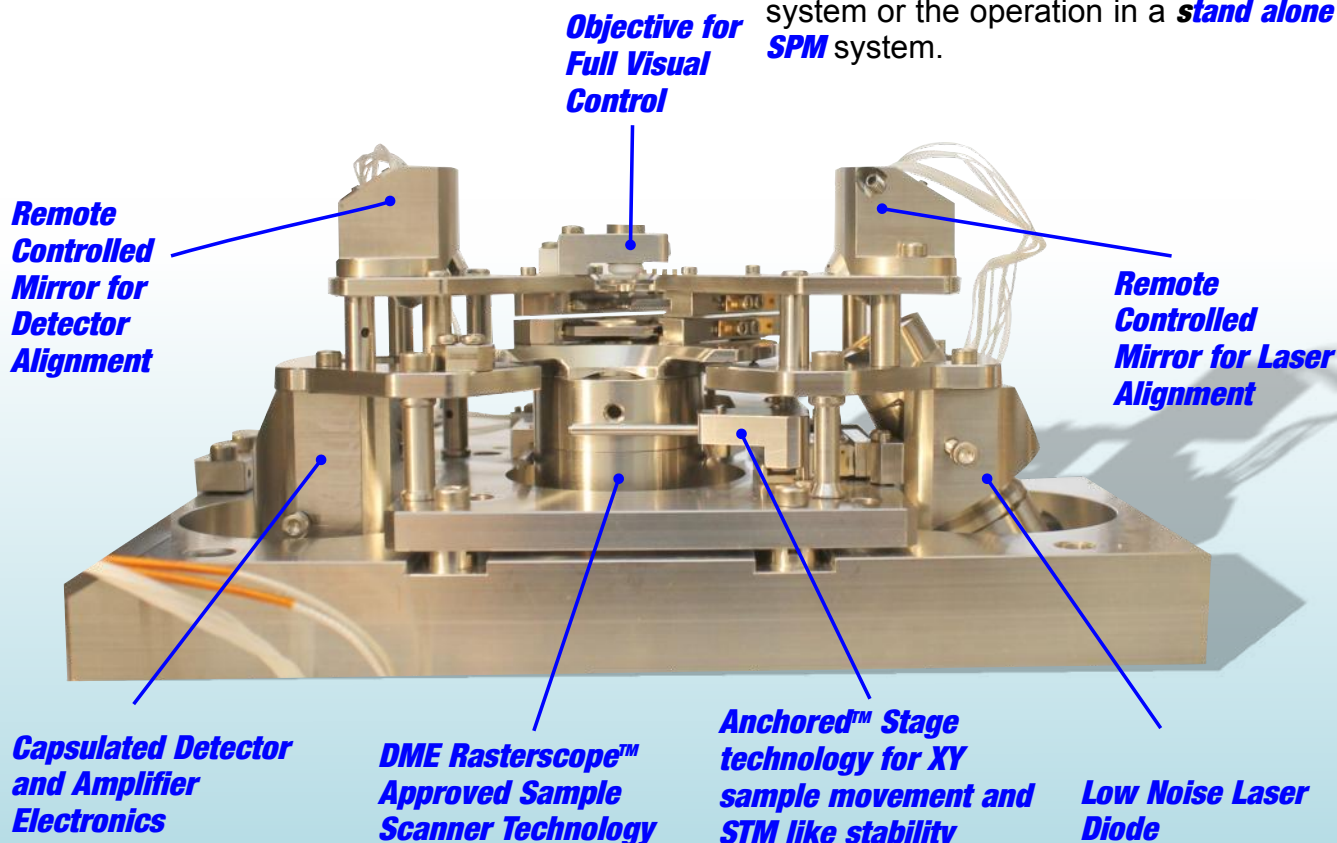
Sensor and Sample exchange via load lock and linear transfer

technology stands for highest reliability and stability in the last decades.

An **integrated CCD camera** and optics enable a top down view onto the cantilever and the sample. Direct visual access enable **remote controlled XY tip-sample navigation** via a software integrated video image.

The freely suspended, vibration **isolated SPM stage** guarantees artifact free measurements also in noisy environments.

A standard DN 250 CF flange mount enables an implementation as **plug and play solution** on your already existing UHV system or the operation in a **stand alone UHV SPM** system.



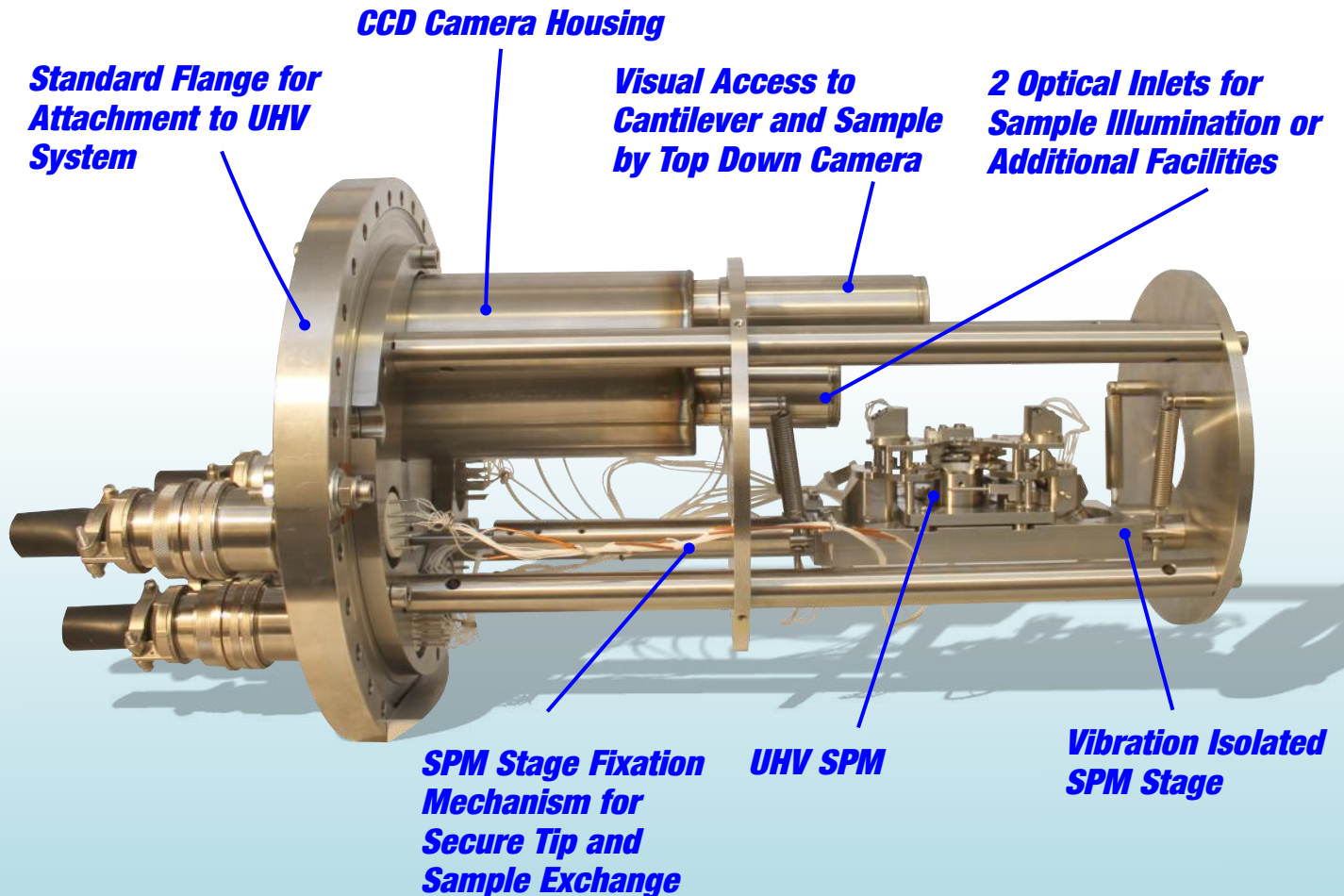
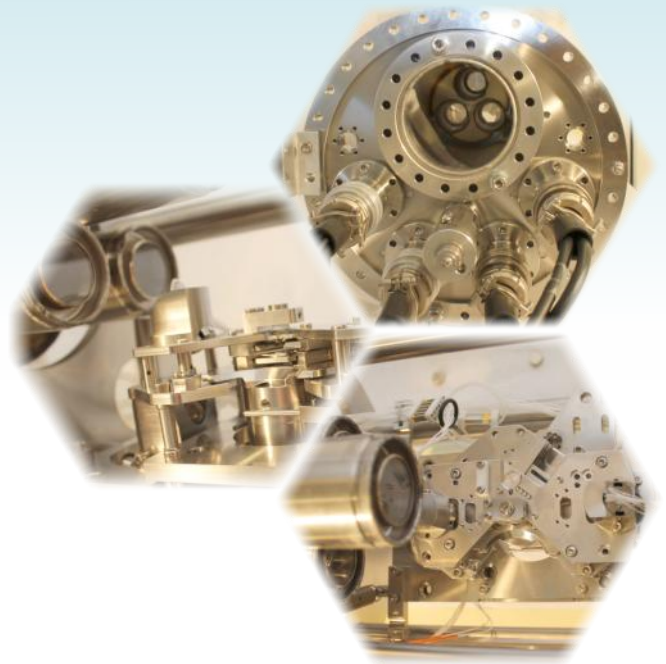
Open Access for Total Visual Control and Additional Analysis Equipment

Two additional feed throughs are available for **additional observation equipment or sample excitation** by laser or other light sources.

By its laser deflection detection system, the DME UHV SPM is able to operate in **all major SPM modes. Frequency modulation (FM)** based imaging modes support utilization of **high Q cantilevers**.

4 free **user defineable electrical feed-throughs** on sample and cantilever side support many kinds of electrical measurements as well as usage of active cantilevers or other probes like thermal cantilevers, akima probes, quartz tuning fork sensors or etched STM wire tips.

The DME UHV SPM means **AFM measurements without compromises** in ultra high vacuum. Achieve highest sample throughputs and measurement comfort nearly like in air. The new DME UHV SPM will **multiply your working speed** under UHV conditions.



DME UHV SPM

Specifications:

AFM

Type: high frequency sample scanner (tube)

AFM scan volume: $9\text{ }\mu\text{m} \times 9\text{ }\mu\text{m} \times 1\text{ }\mu\text{m}$

Max. sample size: $\sim 5\text{ mm} \times 5\text{ mm}$

System resolution: subatomic in all three dimensions (digital resolution $<13\text{ pm x/y}$, $<1\text{ pm}$ in z)

AFM stability:

designed for single atom resolution

Anchored™ Stage: AFM scanner, sample, and cantilever mechanically isolated.

Tip to sample mechanical loop: $\sim 3\text{ cm}$

Scan Modes: AFM contact and noncontact, STM, LFM, PFM, EFM, KFPM, MFM, SSRM, and many more

Supported Cantilevers: All Standard AFM cantilevers

Cantilever mounting: Mechanically clamped

Supported sensors in STM mode:

Conductive cantilevers or etched STM tips

Electronics

Built-in tunnel current amplifier for high resolution current measurements down to pA range

Positioning systems

- $\sim 2\text{ mm}$ X/Y positioning of sample relative to tip by DME Anchored™ stage technology
- Automatic Hardware Laser and Detector alignment by 2 DME X/Y piezo alignment systems
- Tip approach: Fully automatic

Electronics

Built-in tunnel current amplifier for high resolution current measurements down to pA range

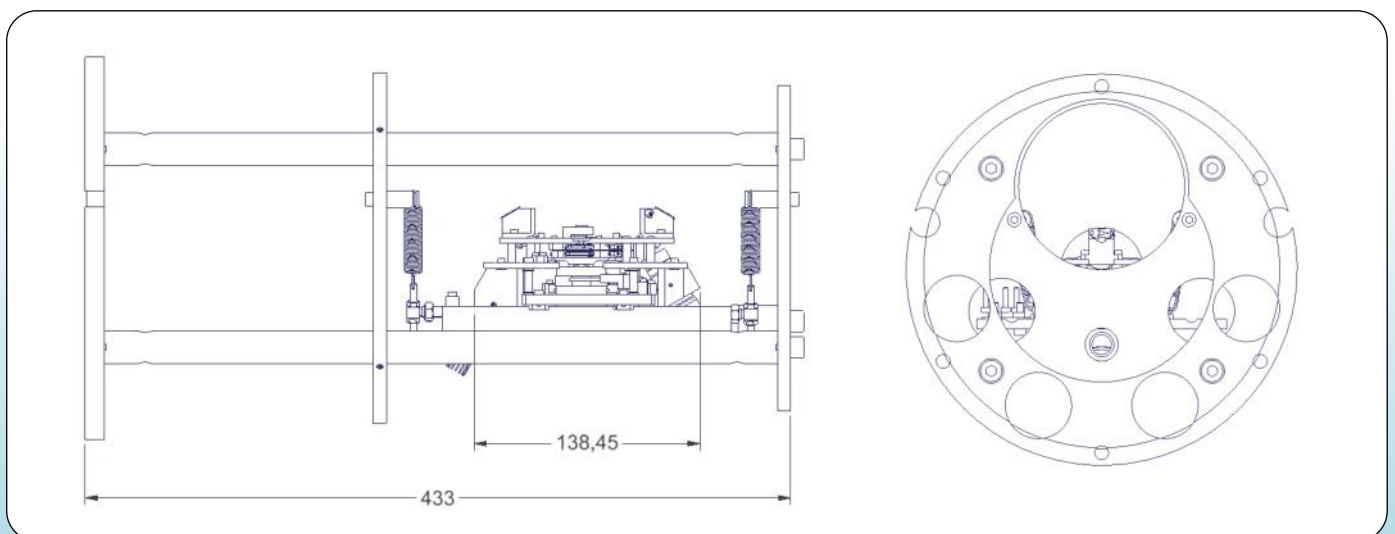
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Further features

- full automatic, programmable AFM experiments
- ScanTool SPM software interface for AFM operation
- 8 user defined electrical feedthroughs (4 on cantilever, and 4 on sample side)
- single load-lock for both cantilever and tip exchange
- joystick based manipulation of sample surface by AFM tip under observation of CCD Camera
- sample illumination from cantilever side possible
- access to sample back-side while scanning e.g. for optical excitation

Dimensions:



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