

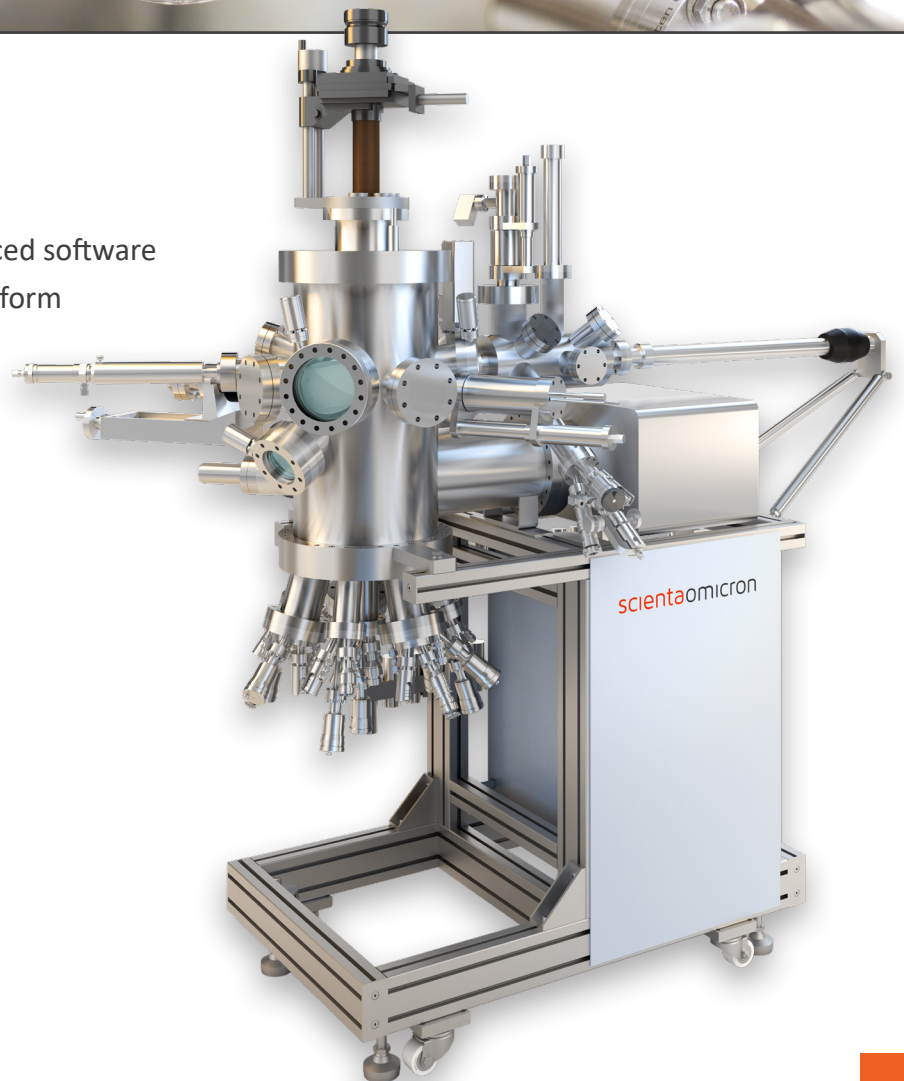
Lab10 MBE

scientaomicron

# Compact Solution for Epitaxial Layer Growth



- Explorative material research in UHV
- Configurable and customisable
- Low cost of ownership
- Growth process controlled by advanced software
- Module for Materials Innovation Platform



# Lab10 MBE - Compact Solution for Epitaxial Layer Growth

The Lab10 MBE is a turnkey small sample research tool for innovative material development under UHV conditions.

This system is designed to fulfil the highest and most stringent requirements of modern thin-film deposition. Furthermore, the small sample concept is intended to interface the MBE system with an UHV analysis module to offer the best platform for fundamental research of novel materials.

## Flexible System Platform

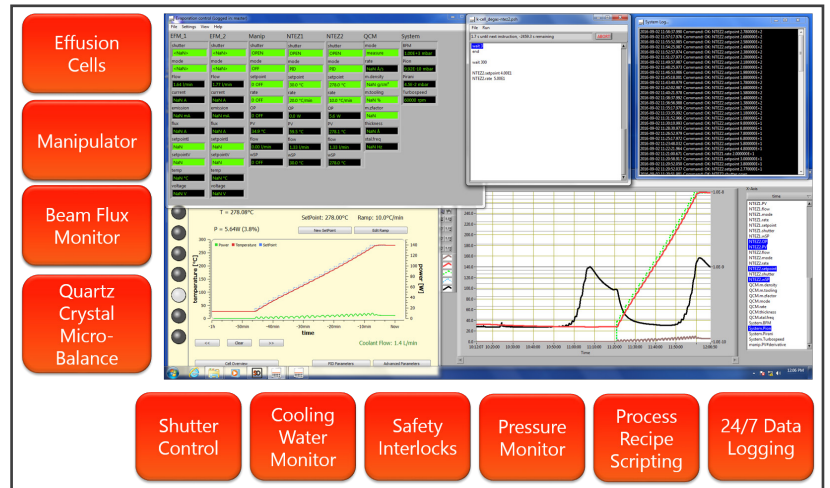
The Lab10 MBE is designed for forefront research. It is a proven platform with more than thirty of such small-sample systems installed worldwide. Our customers use their systems for a variety of material systems, such as:

- Topological Insulators
- 2D Materials, e.g. TMDC's
- Intermetallic Compounds
- Oxides
- Organics
- Semiconductors
- Heterostructures
- Thin Film Solar Cells

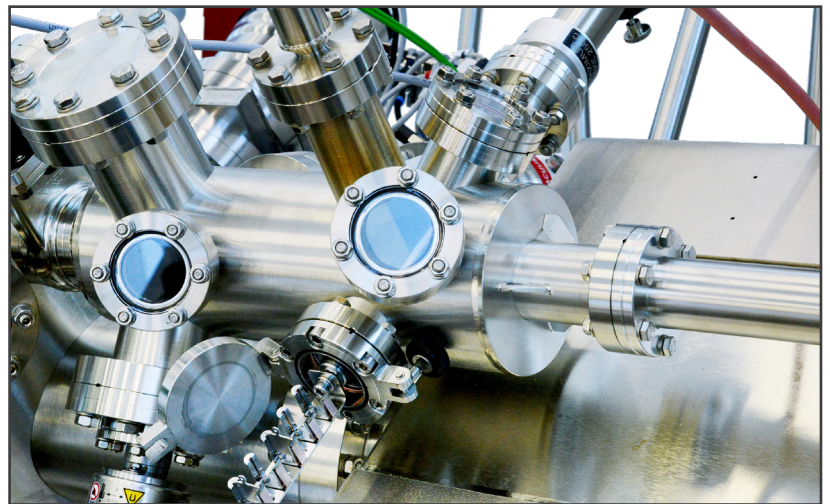
Applying our wide range of expertise, we can offer the best possible solution for every intended purpose. Our local Scienta Omicron sales representatives are trained to assist you in the configuration of your individual system.

## Product Description

The system consists of a deposition chamber and an introduction chamber for sample loading. The deposition chamber includes an efficient cryopanel and an exchangeable cluster flange. It can be equipped with a wide range of field-proven high-quality effusion sources.



The Lab10 MBE includes the MISTRAL control system together with a powerful evaporation control software. The control system is based on certified standard components for supreme reliability and provides a graphical status overview of all sensor values. With this software bundle, experiments can be conducted under well-controlled and reproducible conditions.

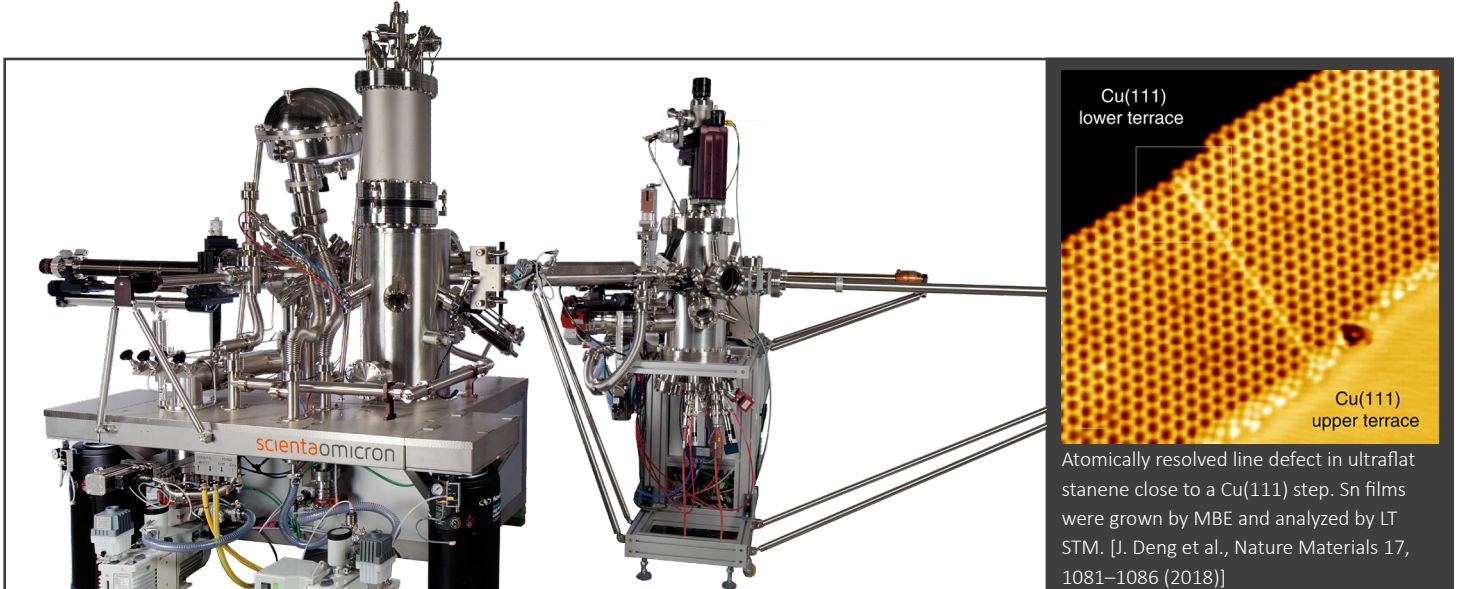


The introduction chamber of the Lab10 MBE system is designed to accept five Scienta Omicron small sample plates, an optional heater stage and a sputter or effusion source. It can be upgraded to a dedicated preparation chamber by adding a separate fast entry lock.

Additional ports for in-situ growth control and viewports are prepared. The Lab10 MBE employs the MISTRAL control system with touchscreen or remote PC interface. Furthermore, safety interlocks protect the UHV system in case of power failure.



# Accelerating the development of novel materials



MIP system consisting of a Lab10 MBE module for material growth and a low-temperature STM module for surface characterisation by STM, STS, and QPlus® AFM. The analytical capabilities of the system are complemented by a separate chamber for angle-resolved photoemission spectroscopy (ARPES), equipped with a R3000 analyser and a He I $\alpha$  light source.

Novel materials with unique combinations of properties are regarded as key enablers for new, disruptive technologies. Understanding cause-effect correlation of these material's growth and structure supports discovery and optimisation of the desired properties. Materials Innovation Platforms (MIP) integrate equipment for growth and detailed characterisation of samples in-situ.

With its compact footprint, the Lab10 MBE is an ideal module for such integrated Materials Innovation Platform solutions. Not only is sample quality preserved by maintaining UHV conditions, but analysis and growth can be done at intermediate process steps and performed far more rapidly than if the instrumentation was separated. This enables better insights into growth mechanics and resulting properties. Ultra-clean layer growth by molecular beam epitaxy can be combined with advanced surface science techniques like SPM, AES, XPS, HAXPES, ARPES, and many others without breaking the vacuum. The ability to expand and upgrade the Lab10 MBE system at a later stage ensures a future-proof investment and an extended system lifetime.

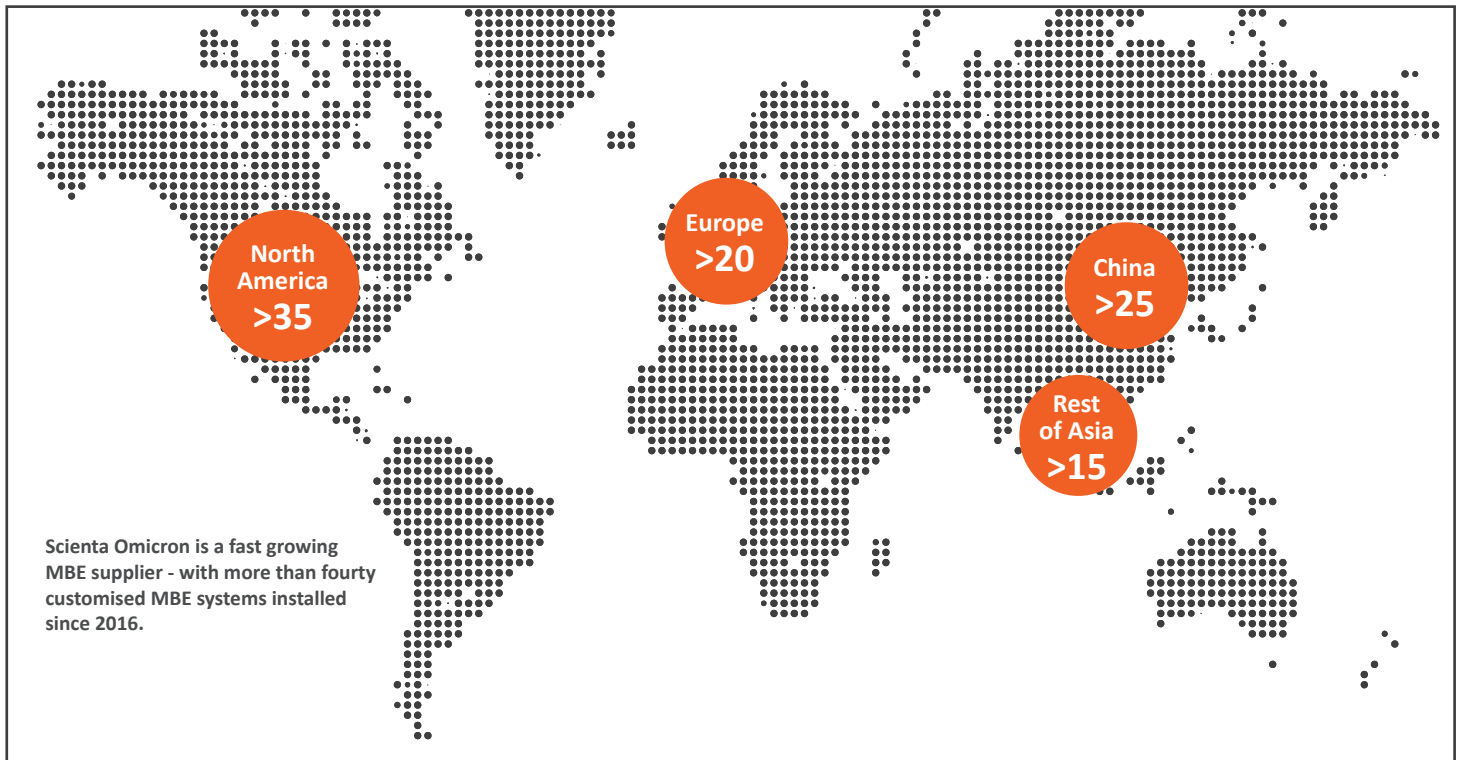
## Tailored Solutions

The Lab10 MBE system is a flexible platform, which can be modified to perfectly match the vision of our customers. We support more than 30 different experimental techniques, and for each, you will find a number of specialists in our company who can support you in project planning, assessment of technique suitability, system design, equipment training, application support, and system upgrades. The Materials Innovation Platform shown above is a great example of unique configuration of MBE, LT STM and ARPES providing direct access to the structural and electronic information of the in-situ synthesized material.

### Lab10 MBE advantages:

- Small footprint
- Low cost of ownership
- Module for Materials Innovation Platform
- Complete software for growth process control
- Each system fully tested in-house
- Consultation by experts
- Configurable and customisable
- Local support team
- Upgradable and expandable

# Worldwide MBE Installation Base

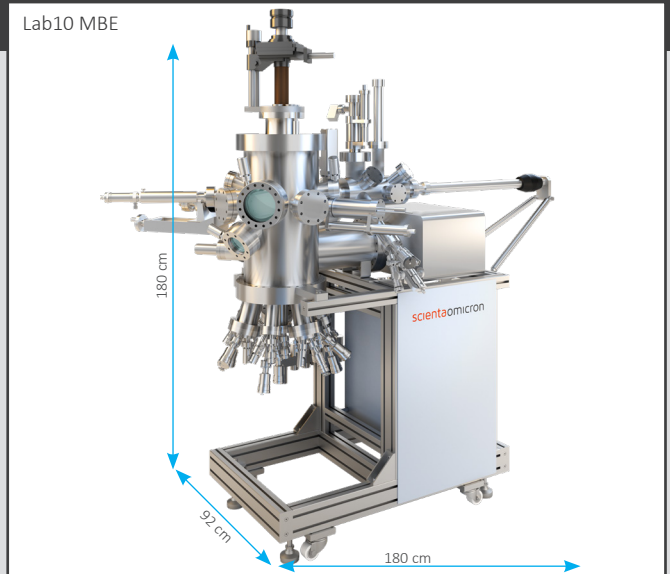


## Technical Data

Property	Target Specification*
Vacuum tank	Stainless steel
Pressure	$< 1 \times 10^{-10}$ mbar
Pressure sensor	Ion gauge
Cryopanel	Included
Baking temperature	150°C
Viewports	Equipped with Viewport Shutters
Introduction Chamber	Included
Software package	Included
Preconfig. flanges	RHEED Quartz Micro Balance Beam Flux Monitor
Manipulator**	Quadrupole mass analyser (RGA) 10 x 10 mm sample size Temperature $RT < T < 1170$ K X/Y- travel $\pm 8$ mm Z- travel 50 mm Azimuthal rotation $\pm 180^\circ$
Cluster flange	Provision to work with direct sample heating 3 x DN63CF 4 x DN40CF 1 x central DN40CF

\* Specifications for standard configuration. Customisations can influence specifications. Please contact us for details.

\*\* Standard manipulator. Options for higher temperatures, LN<sub>2</sub> cooling, oxygen resistance and continuous rotation are available.



The compact dimensions of the Lab10 MBE system of 1800 x 920 x 1800 mm allow to integrate it in an existing laboratory or as an ideal module of a MIP system. In standard configuration the deposition chamber is pumped by an ion getter pump, a titanium sublimation pump and a turbomolecular pump, backed by an oil-free roughing pump.

## How to contact us:

[www.ScientaOmicron.com](http://www.ScientaOmicron.com)

[info@ScientaOmicron.com](mailto:info@ScientaOmicron.com)