

axxplorer[®]
The Innovation Workspace

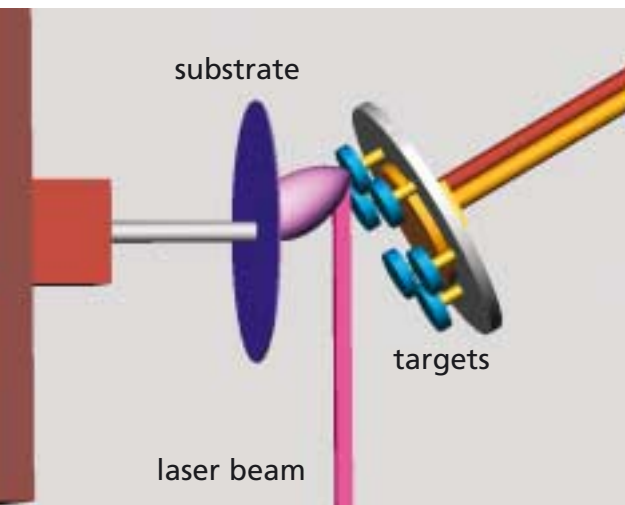
*Empower your business –
PVD-technology for the future*



Laser Deposition

A high energy and short wave (UV) light is used for **Pulsed Laser Deposition (PLD)** to bring the target material (solid target) into the gas phase condensing in a thin layer on the substrate. Therefore, laser ablation belongs to the class of physical vapour deposition techniques (PVD-techniques).

The use of lasers for coating processes shows **a lot of advantages** in contrast to conventional PVD-techniques (evaporation, sputtering) and benefits from the development of the UV-laser technology in the past 10 years by companies like our partner and market leader *Lambda Physik*. As a result nowadays high laser energies (up to 1 J/Puls) and repetition rates (up to 300 Hz) are available for a **thin film deposition in development and production**.



*New Product Functions
with new Materials
High-Quality Layers
Highest Flexibility
One Technology for
all Materials*

Advantages of the laser process:

- ▲ highest flexibility concerning coating materials (targets)
- ▲ complex material stoichiometries transferable
- ▲ high target yield (80-95 %)
- ▲ small, low cost targets (e.g. foils)
- ▲ material ablation beyond the thermodynamic equilibrium
- ▲ combination of various materials (functions) in multi-layer systems
- ▲ highest flexibility concerning the substrate materials
- ▲ no temperature exposure of the substrate
- ▲ easy and rapid handling
- ▲ reactive and inert working pressure up to the mbar-range



The System Technology

axplorer[®]

The ultimate Material-Screening Tool
for Research and Development





axplorer®

The ultimate material-screening tool

Advantages of the System

- ▲ compact coating system
- ▲ low cost of ownership
- ▲ highest flexibility concerning target and substrate materials
- ▲ straightforward handling (substrate mounting, process control, service)
- ▲ easy installation („plug-and-coat“)
- ▲ optional equipment for in-situ analysis or plasma cleaning
- ▲ complete closed optical system (laser class 1)
- ▲ modern design
- ▲ process technology optional

*Highest Flexibility
Easy Process Technology
Compact System
Low Cost of Ownership
Quick Installation
Automation*

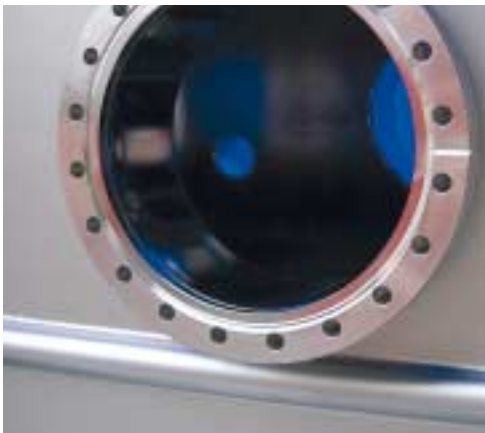


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The ultimate material-screening tool

Details of the System

- ▲ reactor size: 80 l
- ▲ large loading door
- ▲ vacuum down to 10^{-6} mbar
(evaporation time 30 min)
- ▲ number of working gases selectable
- ▲ target exchange system: up to 6 targets
- ▲ rotating substrate holder on x-y-table
- ▲ substrate heater (optional)
- ▲ variable substrate sizes: 1", 2", 4"
- ▲ sensors: temperature, pressure, etc.
- ▲ flange for in-situ analysis, e.g.: mass spectrometer, RHEED, Ellipsometer, AAS
- ▲ program logic control system
- ▲ variable laser system (Compex-class, Lambda Physik)



Smart Development of Thin Films

„Surface- and thin film technologies have proven to be key technologies for future innovative and smart production techniques.“
(German Ministry of Education and Research).

In most applications the used materials have reached their limits. New solutions out of composite systems like bulk material plus surface layers have to be developed. In this case **thin films and multi-layer systems** have to assume **a multitude of functions** concurrently for an optimized adaptation of products to the increased and new challenges in each application. Whether an environmental equitable reduction of energy resources for automotive components with a **low friction and wear resistant surface**, or **long term stable human implants** for the medical care are needed, whether **optical or magnetic storage media** in the semiconductor industry, or **new sensors** for extreme application conditions have to be realized, a maximum of demands are asked by the development of innovative thin films and multi-layer systems.

For a **fast, effective and cost efficient screening** of the whole field of materials in a global competitiveness, a flexible process technology as well as a compact coating system are necessary, which meet these requirements.

Now, every team of researchers independent of the material system it is working on can use with the **axplorer** and the underlying technology of pulsed laser deposition the **ultimate screening-tool** for a smart film development.

axplorer – your access to „**rapid proto coating**“.

Advantages of PLD-Thin Films

- ▲ high adhesion and cohesion
- ▲ compact layers, resulting in low porosity and high refraction index
- ▲ amorphous, nano-crystalline to epitaxial layer growth with high phase purity adjustable
- ▲ deposition of long chained molecules (polymers)
- ▲ ultra thin layer and multi layer systems
- ▲ nano-composites
- ▲ gradient layers
- ▲ high-quality layers

Superconductors	Oxides
Ferro-/Piezoelectrics	
Dielectrics	
CMR-Materials	
Optical Materials	
Electroopt. Materials	
Biocomp. Materials	Carbides/Nitrides
Carbon-Coatings	
Hard Coatings	
Tribolog. Coatings	
Nanocomposites	Polymers
Fluor-Polymers	
Other Polymers	Ferrites
Garnets	
Spinel	Metals
Nobel Metals	
Metals/Alloys	Semicond.
III-V-Semiconductors	
II-VI-Semiconductors	

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