

Blockkurse Nanowissenschaften UniBS

Paul Scherrer Institut

23. Micro- and nanofabrication of surface topographies

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Ort: Paul Scherrer Institut, 5232 Villigen PSI

Dauer und Art des Kurses: 1 week intensive laboratory course

Maximale Teilnehmerzahl: max. 4 Studierende (mind. 3)

No matter, in which field of nanotechnology (nanoelectronics, medical devices, sensors, scanning-probe instrumentation etc.) the students will specialize later on, it is very likely that they will be confronted with problems of top-down microfabrication since the nano-devices, -structures or – components are very often embedded in a microfabricated environment. This one week intensive laboratory course therefore focuses on top-down micro- and nanofabrication technologies in a state-of-the-art clean room environment. The small group of students will be accompanied by an instructor (a process technician or an engineer). The following topics will be treated during the course:

- Introductory lecture on clean room design and operation, laboratory safety and emergency instructions;
- Thin film technologies: metal evaporation with e-gun evaporator, deposition of silicon-nitride by plasma-enhanced chemical vapour deposition;
- Pattern definition by photolithography, electron beam lithography: resist spin-coat, pre-bake, exposure, development, hardbake.
- Pattern transfer: wet etching, dry etching processes, resist stripping, lift-off;
- Replication patterning techniques of topological and chemical structures: fabrication of stamps, polymer molding by nanoimprint lithography, residual layer etching, pattern transfer, surface modification;
- Quality control and characterization: optical microscopy, interferometric film thickness determination, surface profiling, scanning electron microscopy.

In this course the students will get acquainted with the most important processes in micro- and nanofabrication, including new lithographic techniques such as nanoimprint lithography. The students will take home different topological and chemical structures for further characterization.

Goals of this course are:

- Get hands-on experience with the most important microfabrication technologies
- Understand the basics and the mechanisms of microfabrication processes
- Learn how to properly work in a professional clean room environment

Further information:

<http://LMN.web.psi.ch>

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