

Details

CFN - Nanostructure Service Laboratory (CFN-NSL)

The Nanostructure Service Laboratory (NSL) is a central user facility of the Division 5 (Mathematics and Physics) at the Karlsruhe Institute of Technology (KIT), open for all researcher active in the field of nanotechnology. The NSL houses an advanced technological infrastructure for the fabrication and analysis of nanostructures and nanodevices. It operates an almost 210 m² large cleanroom of particulate air cleanliness classes 6 and 7 according DIN EN ISO 14644-1. The NSL provides “state-of-the-art” equipment to researchers, and it develops, optimizes and maintains fabrication methods. Bundling up the experience with the scientific and technical employees of the NSL guarantees the continuity of knowledge transfer. Young scientists profit from it primarily. By the centralization of the equipment park an efficient use of the ressources is achieved. The large-scale equipment (EBL, FIB, SEM) are operated by skilled scientists and technicians who are also responsible for providing introductory and training courses, for supporting the users, equipment maintenance and NSL management.

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Host Institution

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<https://www.kit.edu>

Scientific Domain

Primary Subjects:

- Physics
- Computer Science, Electrical and System Engineering

Secondary Subjects:

- Biology
- Chemistry
- Materials Science and Engineering

Category

Micro- and Nanotechnology facilities

Scientific Services

The NSL provides “state-of-the-art” equipment for the fabrication and characterization of nanostructures and operates an almost 210 m² cleanroom at the KIT (South Campus). About 40 m² meet the requirements of a class 6 cleanroom, the other areas meet the requirements of class 7 according to DIN EN ISO 14644-1. The infrastructure consists mainly of equipment for the structuring, manipulation and characterization of nanostructures. For lithography, a 50-keV electron beam writer, a SEM equipped with Raith Elphy Plus system, direct laser writers for optical lithography in 2D and 3D as well as a Maskaligner are at the user’s disposal. A focussed-ion-beam machine allows for ion beam lithography, ion sputtering and deposition with a focussed metal ion beam. A scanning force microscope, equipment for film deposition and shadow evaporation by means of a thermal evaporation and sputtering, and facilities for reactive ion etching (RIE and ICP) using chlorine and fluorine chemistry, respectively, complete the equipment. Projects at the NSL are executed either

as full service provided by the NSL staff or as a collaborative research project. Under certain circumstance users can use the major equipment on their own after an intensive training. Access to the cleanroom equipment and project-oriented accounting is managed by a web-browser based booking system which provides the basis for the allocation of machine time. For a sustained operation a usage fee is charged to the users to cover the project-specific usage costs of cleanroom and equipment. Third-party funded projects which are performed in building 30.25 (CFN building) have to meet the requirements of a non-profit-making character and of a general benefit to the public, or should be allocated to the public duties.

Scientific Equipment

- 50-keV electron-beam writer
- Scanning electron microscope (SEM)
- Focused-ion-beam (FIB Crossbeam) incl. EDX analysis
- 2D direct laser writing
- 3D direct laser writing
- Optical lithography
- Reactive-ion-etching with flourine chemistry
- ICP based plasma etching with chlorine chemistry
- Electron-beam evaporator
- Thin-film coating of metals
- Scanning force microscopy
- White-light interferometry
- Wet processing
- Software usage for a device-dependent proximity correction (JEOL)
- critical point drying

Keywords

- lithography
- reactive ion etching
- electron microscopy
- energy-dispersive X-ray analysis (EDX)
- microtechnology
- photonics
- nanotechnology
- nanoelectronics
- solid-state research
- semiconductor devices
- photonic devices
- quantum technologies

Networks

Users per annum

Internal Users: 105 (2021)
External Users in total: 0
External Users: 0
External Users in the EU: 0
External Users outside of EU: 0