

Laboratory of Nano and Quantum Engineering

The nanotechnologists of Leibniz Universität Hannover have networked in the Laboratory of Nano and Quantum Engineering to pool their know-how for interdisciplinary excellent basic research and application-oriented engineering at the nanoscale. Involved are 34 working groups from natural sciences and engineering.

Generally nanotechnology deals with structures in the size range of 1 to 100 nanometers. 100 nanometers are about one-thousandth of the diameter of a human hair. Projects in these small dimensions can only be realised almost always in collaboration of various disciplines for success.

Nanotechnology is very diverse, ranging from the progressive miniaturization of microtechnology and microelectronics on a completely new, revolutionary approaches based on molecular self-assembly, through the development of materials in the nanometer range up to the direct control of matter on the atomic scale.

Nanotechnology is currently one of the most promising key technologies. Nanooptimized products are already in almost all major markets.

In the research building of the Laboratory of Nano and Quantum Engineering technologies are central available for the production and characterization of very small structures in a 400 square meter clean room.



We offer

- Research expertise of 34 nanotechnology groups
- Nanotechnology education
- Extensive technological opportunities through the research building and the equipment of the participating groups

What we can do for you

- Cooperation for R & D projects in nanotechnology
- Placement of graduates of the study program Nanotechnology (BSc and MSc) and doctoral candidates of nanotechnology
- Technological commissions for nanostructuring

Contact

Do you want to get to know us or have questions?
Then please feel free to contact:

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Laboratory of
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**Laboratory of
Nano and Quantum Engineering**
Research centre for nanotechnology

Education

Colloquium and Workshops

In LNQE Colloquium, interdisciplinary research is presented to a wider audience by lecturers from the LNQE and external guests. Once a year, the full-day workshop NanoDay takes place where the latest results of nanotechnology research from Hannover is shown in talks and poster sessions.

Study Course Nanotechnology

The Leibniz Universität Hannover provides the interdisciplinary study program Nanotechnology at both bachelor and as a consecutive master's program. The course teaches the basics of nanotechnology in the core subjects chemistry, electrical engineering, mechanical engineering and physics (supplemented by mathematics), while the requirements of which arise from nanotechnology are supported in particular. Overall, the degree program nanotechnology has more than 240 students - and rising!

Phd programme „Hannover School for Nanotechnology“

The Hannover School for Nanotechnology is a coordinated doctoral program of the Laboratory of Nano and Quantum Engineering of Leibniz University Hannover together with Hannover University of Applied Sciences and Arts, funded as a doctoral program of Lower Saxony by the Ministry of Science and Culture of Lower Saxony. The disciplines physics, chemistry, electrical engineering and mechanical engineering are integrated into the program. The aim of the doctoral program is the interdisciplinary training of young scientists in the highly topical field of nanotechnology.



Research

Nano engineering and Quantum engineering

Research focuses on quantum interference and quantum transport in low-dimensional systems, fabrication and characterization of graphene structures, quantum sensors, atomic inertial sensors, ultracold molecular quantum gases, simple and coupled quantum dot systems, and spin effects, application of nanoscale materials in thin film solar cells, three-dimensionally measure GMR sensors, photonic crystals, nanostructures and devices for plasmonics, coherence effects in the electron-hole-spin coupling and application of spin-polarized charge carriers in semiconductor lasers.

Nanomaterias

Investigations of nanoparticles for dye solar cells, coatings with nanoparticles for self-cleaning surfaces, nanoparticles with photocatalytic properties for the purification of air and water, superparamagnetic nanoparticles in flow reactors, and biocompatible nanomaterials for medicine. Studies on the possible toxicity of nanomaterials. Simulation at the nano-level, multi-scale analysis of nanomaterials and interfaces to macroscopic objects.



Nanoanalytics

The artificially created structures and materials are investigated in a wide variety and analyzed. The analysis in the nanometer range requires variety of latest equipment and techniques. The necessary technological equipment is centrally located in the LNQE research building and is complemented by the equipment in the institutes.



Research Building

To achieve its objectives the LNQE operates an own research building in Hanover, with laboratories, equipment, etc., and especially clean rooms.

Technology in the Research Building

Lithography:

- Photolithography for Silicon and Germanium
- Photolithography for all other materials
- Electron Beam Lithography

Thin Film Preparation:

- Vertical Oven System
- Horizontal Cluster System
- Polyamid Oven
- Plasma CVD
- Sputtering System
- Evaporating System
- Rapid Thermal Processing
- Ion Implanter

Structuring:

- Wet Benches
- Reactive Ion Etching

Characterization:

- Confocal Microscope
- Spectral Ellipsometer
- Wafer-Probe Station
- Transmission Electron Microscope