

# Laboratory for Emerging Nanometrology (LENA)



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## Contact

LENA – Laboratory for Emerging Nanometrology

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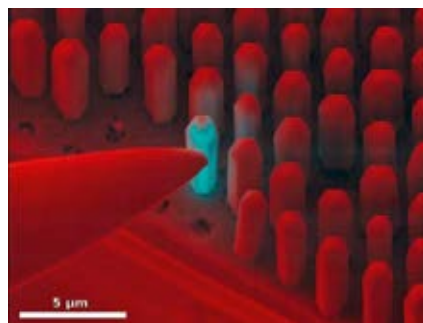
## Mission Statement

The research center LENA is focusing on the development and application of nanometrology – precise measurements at the nanometer scale – to enable and support novel science and applications in nanotechnology.

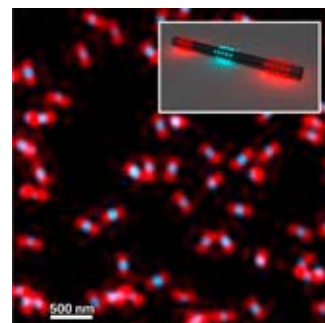
## Research

LENA performs interdisciplinary fundamental research from synthesis, analytics and theory of nanomaterials to nanotechnological applications. Its scientific activities can be grouped into three core research areas: 1) Precise characterizations of nanomaterials and 3D-nanosystems with assessment of measurement uncertainties and retraceability of measurands to SI units. 2) Improvement of nanoanalytics for continuously enhanced sensitivity and precision of the applied methods. 3) Development of ubiquitous sensors, for example, to detect nanoparticles or exploit the unique properties of nanomaterials to build small ultra-sensitive sensors for various applications like biomedical diagnostics or environmental online monitoring, or nano-standards that can serve as points of reference for calibrations everywhere.

As a nano-analytics center par excellence LENA will be equipped with a unique combination of high-end instrumentation. High-resolution imaging methods, spatially and temporally resolved spectroscopy, surface manipulation and analytics as well as particle property measurement instrumentation will be operated by the expert member groups of LENA.



Electro-optical characterization of 3D-LEDs with a scanning electron microscope: Light emitting region of a contacted core-shell LED inside an ensemble visualized by EBIC and SE imaging. (TU-Braunschweig, Institute of Semiconductor Technology, J. Ledig)



Fluorescence microscopy of DNA-Origami nanorulers with structured illumination microscopy: GATTA-SIM nanoruler with fluorescent marks containing ATTO647N (red) and Alexa488 (blue) within distances of 160nm (red-red) and 80nm (red-blue) imaged on a Zeiss ELYRA system. (TU-Braunschweig, Institute for Physical and Theoretical Chemistry, GATTAquant)

## Organisation

The LENA Management Board:  
Prof. Dr. Andreas Waag (speaker),  
Prof. Dr. Meinhard Schilling (vice speaker),  
Prof. Dr. Georg Garnweitner, Dir. and  
Prof. Dr. Harald Bosse and Dir. and  
Prof. Dr. Fritz Riehle.

## Research Infrastructure

A new research building for LENA is under construction, planned to be operative end of 2017. The total investment of more than 33 million € is divided into construction (2/3) and instrumentation sum (1/3) and provided by the German Federal Government (14.5 million €) and the Federal State of Lower Saxony. One part of the LENA building will include laboratories and analytical instrumentation (two floors, ~1,400 sqm), a second part will include offices and seminar rooms (3 floors, ~1,200 sqm) for more than 100 scientists, technicians and students.

## Funding

DFG, State of Lower Saxony, EU, BMBF, BMWi, Industry

## The Research Centre LENA

LENA – one of the Carolo-Wilhelmina research centers of Technische Universität Braunschweig (TU-BS) – combines research activities of 12 groups from TU-BS and 8 groups of the Physikalisch Technische Bundesanstalt (PTB) Braunschweig, including electrical-engineering, semiconductor-, microsystems-, and particle-technology, physics, chemistry, optics, production measurement technology and more, to enable interdisciplinary research in the field of nanometrology, being one of the key research areas of TU-BS. LENA, being part of the “Metrology Initiative Braunschweig” (MIB) pooling further joint metrology activities like joint TU-BS/PTB appointments and graduate education programs, will also include several junior research groups.



Members of the Institute of Semiconductor Technology are coating nanostructures using an atomic layer deposition (ALD) system.

## Publications and Patents

see also [www.tu-braunschweig.de/mib/lena](http://www.tu-braunschweig.de/mib/lena) and member author's literature search (e.g. Scopus database)

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