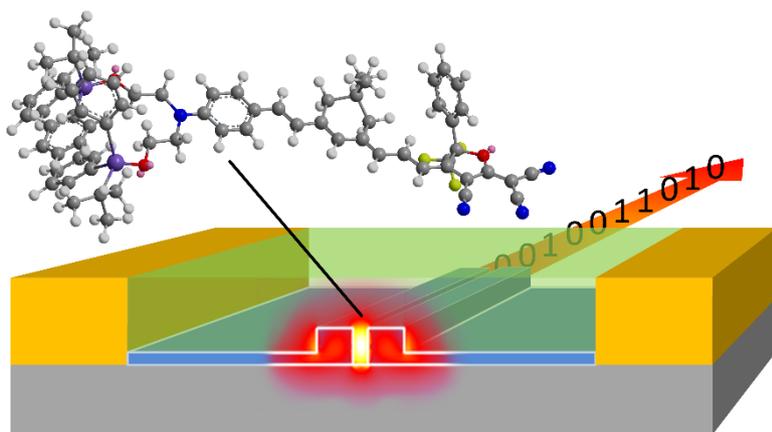


## Turning Research into Innovations

ERC Funds for Commercializing Fundamental Research Results Go to KIT – Chemical Analysis by Mobile NMR – Optical Data Transmission Between Chips



*Microscopic components made of silicon (blue) and special polymers (green) convert electrical into optical signals and vice versa. (Graphics: KIT)*

The European Research Council (ERC) has decided to fund two innovative ideas of Karlsruhe Institute of Technology (KIT). For their first steps from fundamental research to commercialization, these projects are now granted about EUR 150,000 each. The so-called “Proof of Concept Grants” serve to further develop application-relevant research findings for the market. The KIT projects funded by the ERC cover the analysis of biological samples and data transmission by light.

### SCOOTER – Silicon-organic Hybrid Transceivers for Terabit/s Data Networks

“Our digital society’s thirst for data makes communication networks and data centers reach their limits,” Professor Christian Koos of the KIT Institutes of Photonics and Quantum Electronics and of Microstructure Technology, says. “Compact, energy-efficient transmitter and receiver units for optical networks are the key to overcoming these bottlenecks.” The SCOOTER project is aimed at reaching a serial data transmission rate above 100 gigabits per second and, at

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the same time, meeting the high requirements associated with microintegration and energy efficiency of chips. As a basis, very small components of silicon and special polymers will be used for conversion of electrical into optical signals and vice versa. Research of KIT has shown that such modulators are not only quicker than conventional components, but also consume far less energy. Moreover, they can be integrated on microchips in large numbers at low costs. Hence, they are excellently suited for data transmission in future Ethernet connections, allowing for data rates between 400 and 1000 gigabits per second. With the funds of the ERC, SCOOTER will now analyze the opportunities on a billion-euro market and draft a business plan for negotiations with investors and the establishment of a startup.

### **LockChip – A Custom Lock Chip for Compact NMR**

Direct chemical analysis in real time without elaborate processing at the laboratory accelerates fundamental research and production processes in e.g. environmental protection, material testing, and quality checks or in chemical, pharmaceutical, and food industries. Nuclear magnetic resonance (NMR) spectroscopy can be applied for this purpose, as it is flexible, precise, and molecule-specific. In the past years, NMR devices became smaller, more mobile, and cheaper, as better evaluation electronics allows for the use of smaller magnets. “But a problem that is not yet solved satisfactorily is the dependence of measurements on ambient temperature,” says Professor Jan G. Korvink of KIT’s Institute of Microstructure Technology (IMT). To eliminate the temperature effect, known calibration substances are mixed into the sample or evaluated in a second NMR device. However, this results in further disadvantages depending on the process. LockChip eliminates these drawbacks. The stand-alone NMR device is so small that it hardly needs space in the main detector and does not interfere with the latter’s magnetic field. As calibration substances are not released into the measurement volume, contamination of the sample is prevented. Within the framework of the LockChip project and at his startup Voxalytic GmbH, Korvink plans to further develop the product and prepare entry into the growing market.

The **European Research Council (ERC)** is the European organization funding excellent fundamental research. The proof of concept grants in the amount of EUR 150,000 each can be used for protecting intellectual property, studying business options, or for technical validation. By this grant, the ERC wishes to bridge the gap between fundamental research and the early phases of commercialization.

**Karlsruhe Institute of Technology (KIT) pools its three core tasks of research, higher education, and innovation in a mission. With about 9,300 employees and 25,000 students, KIT is one of the big institutions of research and higher education in natural sciences and engineering in Europe.**

**KIT – The Research University in the Helmholtz Association**

*Since 2010, the KIT has been certified as a family-friendly university.*

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