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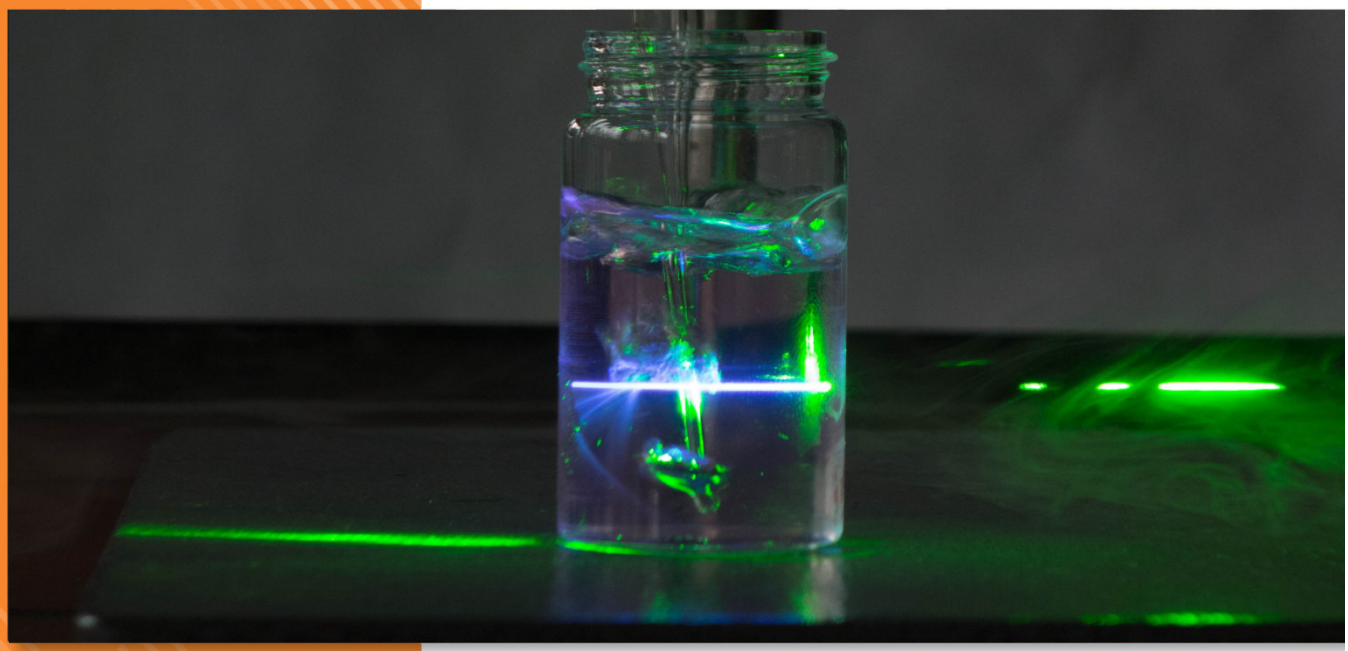

ULTRA-LOW-POWER GAS SENSOR SYSTEMS

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We focused our research in the last 10 years on the development of new approaches to reduce power consumption in conductometric, solid-state, gas sensors. In this presentation we will review the state-of-the-art, including some of our contributions.

First, we will show how power consumption in semiconductor devices can be lowered to just a few microwatts by means of the self-heating effect occurring in nanomaterials. Only a decade ago, this principle was proved with fully hand-made devices. Today, it is possible to achieve comparable efficiencies with devices produced in mass scale, using widely spread micro and nanofabrication techniques.

Second, we will move to light activated chemical sensors, where dramatic power savings can be achieved by combining the power efficiency of light emitting diodes (LED) with aggressive miniaturization efforts. Using industry standard technologies, it is possible to offer sub-milliwatt power demands in monolithic integrated microLED devices that can be produced in large amounts (so-called Micro Light Plates). We will also show how optical activation opens the door to complementary operation approaches, based on light energy harvesting that can enable virtually zero-power devices in the near future.

Third, "ultralow power consumption" challenges all the components of a smart system. Beyond the power saving sensing device, efficient signal conditioning, acquisition, and processing electronics, and low energy protocols in the components in charge of data communications are crucial. We will reflect on what is possible today and its implications.

13. Dezember 2022
16:00 Uhr
Campus Freudenberg
Hörsaal FZH3

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