

**Novel semiconductor sources and detectors for THz radiation:  
a brief overview.**

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THz radiation has proven to be an interesting commodity for spectroscopy as well as sensing and imaging purposes. While spectroscopic measurement systems are already offered commercially, it is less clear to what extent THz sensing and imaging find their way into commercial products.

Many potential applications require significant improvements with respect to the sources and detectors of THz radiation. This, on the other hand, opens the rare situation for THz photonics that the way from fundamental research to potential applications can be a rather direct one.

The talk will present three examples of ongoing developments motivated in the way addressed above. (i) Research on internal-mixing devices, i.e., high-power semiconductor lasers or amplifiers which are designed in such a way that THz radiation is generated directly in the active region. (ii) Research aiming at the so-called Bloch lasing, an efficient second-order gain mechanism based on electron dynamics in semiconductor superlattices. Both THz sources target room-temperature operation and a high degree of compactness. The third example is that of a THz radiation detector based on charge dynamics in the channels of field-effect transistors. This detection approach could become the basis for inexpensive multi-pixel receivers as they are needed for active and passive THz cameras.