

# LASER & PHOTONICS REVIEWS

## Terahertz sensing and imaging based on nanostructured semiconductors and carbon materials

The advantageous properties of terahertz (THz) waves, such as permeability through objects that are opaque for visible light and the energy spectrum in the microelectron-volt range that are important in materials research, allow their potential use in various applications of sensing and imaging. However, since the THz region is located between the electronic and photonic bands, even the basic components such as detectors and sources have not been fully developed unlike in other frequency regions. THz technology has also the problem of low imaging resolution, which results from a considerably longer wavelength than that of the visible light. However, the utilization of nanostructured electronic devices has recently opened up new horizons for THz sensing and imaging. In his paper, **Y. Kawano** (pp. 246–257) provides an overview of the THz detector and imaging techniques and tracks their recent progress. Specifically, two cutting-edge techniques, namely, frequency-selective THz-photon detection and integrated near-field THz imaging, are discussed in detail. Finally, the studies of superconductors and semiconductors with high-resolution THz imaging are described.