Terahertz sources and methods for nonlinear spectroscopy of solids, liquids, and gases

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A review will be given of methods for generation of THz pulses with sufficient field strengths and intensities to drive and measure nonlinear responses in a wide range of materials and molecules. Tabletop sources of intense THz pulses will be emphasized. Methods and results of nonlinear THz spectroscopy and THz coherent control will then be reviewed. Results from the author's group on solid, liquid, and gas-phase samples will be discussed, and selected results from other groups will be presented to illustrate the range of nonlinear THz spectroscopy as an emerging subfield.