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Broadband THz Spectroscopy of 2D Nanoscale Materials[1] LU CHEN, SHIVENDRA TRIPATHI, MENGCHEN HUANG, JEN-FENG HSU, BRIAN D'URSO, University of Pittsburgh, HYUNGWOO LEE, CHANG-BEOM EOM, University of Wisconsin-Madison, PATRICK IRVIN, JEREMY LEVY, University of Pittsburgh — Two-dimensional (2D) materials such as graphene and transition-metal dichalcogenides (TMDC) have attracted intense research interest in the past decade. Their unique electronic and optical properties offer the promise of novel optoelectronic applications in the terahertz regime. Recently, generation and detection of broadband terahertz (10 THz bandwidth) emission from 10-nm-scale $LaAlO_3/SrTiO_3$ nanostructures created by conductive atomic force microscope (c-AFM) lithography has been demonstrated [2]. This unprecedented control of THz emission at 10 nm length scales creates a pathway toward hybrid THz functionality in 2D-material/$LaAlO_3/SrTiO_3$ heterostructures. Here we report initial efforts in THz spectroscopy of 2D nanoscale materials with resolution comparable to the dimensions of the nanowire (10 nm). Systems under investigation include graphene, single-layer molybdenum disulfide (MoS_2), and tungsten diselenide (WSe_2) nanoflakes.

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