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Sensitive room-temperature graphene-BN atomic stack terahertz detector JIAYUE TONG, MARTIN MUTHEE, SHAO-YU CHEN, SIGFRID K YNGVESSON, JUN YAN, University of Massachusetts Amherst — Due to its high mobility, weak electron-phonon interaction and tunable broadband optical response, graphene is a promising material for high-speed optoelectronics such as terahertz (THz) detectors. In this presentation, I will discuss our studies of THz detection with graphene-BN heterostructure devices. Using a double-patch antenna that operates at around 1.9THz and an on-chip silicon lens, we demonstrate that asymmetrically-contacted graphene-BN heterostructure samples can efficiently detect THz laser radiation. Strong polarization dependence of our device indicates significant sensitivity improvement by antenna coupling and silicon lens coupling. We also find that responsivity can be tuned by changing the charge carrier density. Our work expands the methodology for making graphene-based THz detectors.

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