

Graphene-based terahertz and infrared photodetectors: Can they surpass all others?

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The characteristic properties of the energy spectrum and carrier transport in graphene layers (GLs) provide an opportunity to use different GL heterostructures in active and passive optoelectronic and plasmonic devices.

Our presentation will deal with an overview of the concepts of novel terahertz (THz) and infrared (IR) photodetectors utilizing the interband and intraband transitions both within GLs and between GLs. The photodetectors under consideration are based on single- and multiple-GL structures with non-Bernal stacked (twisted) GLs, as well as on the heterostructures with GLs separated by barrier layers made of transition metal dichalcogenides (hBN, MoS₂, WS₂, and others). We will discuss the specific features of GL-based THz/IR photodetectors that can ensure their superiority over the standard photodetectors.