

# Terahertz photonics devices exploiting 2D materials

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Bi-dimensional nano-materials and related heterostructures are establishing themselves as intriguing material systems for the development of a new class of electronic, photonic and plasmonic devices with ad hoc-properties, that can be engineered "from scratch". Huge potential can be envisaged in a variety of application fields, ranging from optical modulators, to optical communication modules, from near-field components to photodetectors. Their peculiar band-structure and electron transport characteristics, which can be easily manipulated via layer thickness control, suggest they could also form the basis for a new generation of high-performance devices operating in the Terahertz frequency range (1-10 THz) of the electromagnetic spectrum. This talk will review latest achievements in the developments of active and passive THz photonic and nano-electronic devices exploiting 2D nano-materials and combined heterostructures and will discuss future perspectives of this rapidly developing research field.