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Title:Terahertz detection by heterostructured InAs/InSb nanowire based field effect transistors

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Abstract:Heterostructured InAs/InSb nanowire (Nw) based field effect transistors (FET) have been fabricated and tested as Terahertz radiation detectors. While responsivity and noise equivalent power compare with the ones of InAs nanowire detectors, the presence of small-gap InSb semiconductor gives rise to interesting physical effects such an increase of the detected signal with charge injection through the wire, at odds with standard FET-detectors. Additionally, the photodetected signal voltage changes its sign after a threshold gate bias, which we explain considering surface-related transport and field asymmetries imposed by the use of a lateral gate electrode.

Number of references:16

Inspec controlled terms:charge injection - field effect transistors - III-V semiconductors - indium compounds - nanowires - terahertz wave detectors

Uncontrolled terms:field asymmetry - surface related transport - threshold gate bias - photodetected signal voltage - FETdetector - charge injection - noise equivalent power - responsivity - THz radiation detector - field effect transistor - heterostructured nanowire - terahertz detection - InAs-InSb

Inspec classification codes:B2560S Other field effect devices - B7230 Sensing devices and transducers

Chemical indexing:InAs-InSb/int InAs/int InSb/int As/int In/int Sb/int InAs/bin InSb/bin As/bin In/bin Sb/bin

Treatment:Practical (PRA); Experimental (EXP)

Discipline:Electrical/Electronic engineering (B)

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