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Title:Plasmonic terahertz detection by a double-grating-gate field-effect transistor structure with an asymmetric unit cell

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Abstract:Plasmonic terahertz detection by a double-grating gate field-effect transistor structure with an asymmetric unit cell is studied theoretically. Detection responsivity exceeding 8 kV/W at room temperature in the photovoltaic response mode is predicted for strong asymmetry of the structure unit cell. This value of the responsivity is an order of magnitude greater than reported previously for the other types of uncooled plasmonic terahertz detectors. Such enormous responsivity can be obtained without using any supplementary antenna elements because the double-grating gate acts as an aerial matched antenna that effectively couples the incoming terahertz radiation to plasma oscillations in the structure channel.

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