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Author

Stebunov Y. Leiman V. Arsenin A. Gladun A. Semenenko V. Ryzhii V.

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Stebunov Yury; Leiman Vladimir; Arsenin Aleksey; Gladun Anatoly; Semenenko Viacheslav; Ryzhii Victor

Author/Editor Affiliation

Stebunov Y. Leiman V. Arsenin A. Gladun A. Semenenko V. : Department of General Physics, Moscow Institute of Physics and Technology, Moscow Region, Dolgoprudny 141700, Russia

Ryzhii V. : Computational Nanoelectronics Laboratory, University of Aizu, Aizuwakamatsu, Fukushima 965-8580, Japan

Title

Detection of Modulated Terahertz Radiation Using Combined Plasma and Mechanical Resonances in Double-Carbon-Nanotube Device

Source

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Abstract

We propose a resonant detector of terahertz radiation modulated by megahertz or gigahertz signals. The detector is based on mechanically floating carbon nanotubes (CNTs), suspended over an insulator. The device operation is associated with the excitation of both plasma and mechanical oscillations in CNTs resulting in an ac displacement current between them. This current plays the role of the detector output signal. Using the proposed device model, we find that the frequency dependence of the detector responsivity exhibits a sharp peak at the combined plasma-mechanical resonance and estimate its maximum value. (36 References).