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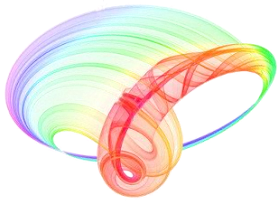

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VIII International School and Conference on Photonics

& HEMMAGINERO workshop

23 - 27 August 2021,

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Editors

Mihailo Rabasović, Marina Lekić and Aleksandar Krmpot

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Active terahertz metamaterial for polarization manipulation and biosensing

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Controlling states of circular polarization with metamaterials [1] enables diverse applications in information processing, spectroscopy and communications. Furthermore, strong modulation of polarization of terahertz (THz) electromagnetic waves can be achieved by integrating active material (such as graphene) with metamaterials [2,3]. The chiral effects can be tuned and metamaterial sensing capabilities can be improved by dynamical modulation of the graphene conductivity. Nowadays, there is a need for rapid and reliable detection of biological samples, especially viruses. The advantage of active metamaterials is precise distinction in between viruses, which is challenging due to their nearly comparable refractive indices. This makes them appropriate for biosensor applications [4,5].

In this work, we numerically investigate THz electromagnetic wave propagation through metamaterial composed of resonant elements based on metallic strips embedded with gated graphene layer. The analysis is provided by calculation of cross- and co-reflection coefficients and efficiency of linear to circular polarization conversion with the change of the Fermi energy of graphene. In addition, the sensitivity of reflection spectra is tested for variations of refractive index, using the data available in the literature for several types of viruses, which is indicative for performance of the proposed metamaterial as a potential biosensor. We expect that proposed structure will enable easier biosensor fabrication with enhanced detection sensitivity compared to previously numerically investigated structures.

REFERENCES

[1] D. B. Stojanović, G. Gligorić, P. P. Beličev, M. R. Belić, Lj. Hadžievski, IEEE J. Sel. Top. Quantum Electron., 27, 4700506 (2020).
[2] S. J. Kindness et al, Adv. Optical. Mater. 2020, 1000581 (2020).
[3] T-T. Kim et al, Sci. Adv. 3(9), e1701377 (2017).
[4] Y. Zhang, Y. Feng, J. Zhao, Carbon 163, 244-252 (2020).
[5] M. Amin, O. Siddiqui, H. Abutarboush, M. Farhat, R. Ramzan, Carbon 176, 580-591 (2021).