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Graphene-based Patch Antenna Tunable in the Three Atmospheric Windows

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Abstract: A graphene microstrip patch antenna is designed to operate in the three bands of the atmospheric windows promising for the future wireless communications. The graphene has a reconfigurable surface conductivity that can be tuned to operate at the desired frequencies. This paper studies the role of chemical potential (μ_c) of the graphene to tune the resonant frequency of a microstrip antenna. The results show that the resonant frequency of a microstrip antenna increases as the chemical potential grows that can be employed to realize a reconfigurable antenna. The proposed resonances for the low-loss 300 GHz, 350 GHz and 410 GHz atmospheric windows can be achieved for $\mu_c = 0.21$ eV, $\mu_c = 0.4$ eV and $\mu_c = 1.5$ eV respectively. Finally, a design process for a multi-band graphene-based antenna has been presented.

Keywords: Reconfigurable Antenna; THz band; Atmospheric windows;

Microstrip Patch-antenna; Graphene.

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