A graphene-based terahertz detector and interferometer in one

Klaas-Jan Tielrooij[1,2]
Ronny De La Bastida[1], Enzo Rongione[1], Karuppasamy Soundarapandian[3], Anand Nivedan[1], David Saleta Reig[1], Frank Koppens[3], Sebastian Castilla[3]
[1]*Catalan Institute of Nanoscience and Nanotechnology, Campus UAB, Bellaterra (Barcelona), Spain*
[2]*Eindhoven University of Technology, Den Dolech 2, Eindhoven, the Netherlands*
[3]*ICFO – The Institute of Photonic Sciences, Av. Carl Friedrich Gauss, Castelldefels, Spain*
Klaas.tielrooij@icn2.cat

Terahertz (THz) radiation is harmless due to its low photon energy and useful for many applications, ranging from security to non-destructive testing. However, detecting THz light has been challenging, in comparison with other parts of the electromagnetic spectrum, such as visible light.

A few years ago, we demonstrated that graphene has properties that enable it to detect THz light with a high speed, a high sensitivity and over a broad frequency range [1]. The detection mechanism is based on THz-induced carrier heating [2] and the photo-thermoelectric effect [3].

Very recently, we developed a graphene-based THz detector that simultaneously acts as an interferometer. This allows it to be used for the non-destructive, all-optical determination of the thickness of visibly opaque thin materials, such as coatings. This is an interesting application, for example for the automotive industry.

References

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