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Surface plasmons in doped graphene excited by the Attenuated Total Reflection technique in the THz regime[1] F. RAMOS-MENDIETA, Departamento de Investigacion en Fisica, Universidad de Sonora, Hermosillo, Sonora, Mexico., J.A. HERNANDEZ-LOPEZ, M. PALOMINO-OVANDO, Facultad de Ciencias Fisico-Matematicas, Benemerita Universidad Autonoma de Puebla, Puebla, Puebla, Mexico — Surface plasmons of transverse electric (TE) and transverse magnetic (TM) polarization in doped free-standing graphene are numerically investigated at THz frequencies. For detecting these modes sufficient sensitivity of the prism-based Otto configuration is demonstrated. Complete agreement with the TM dispersion relation is found in doped graphene of Fermi level $\mu = 0.8$ eV; perfect absorption due to wave interference is also observed. On the other hand, TE surface plasmons are special surface vibrations without induced surface charge; they are self-sustained current oscillations (unique of graphene) that arise in frequency ranges where the imaginary part of the graphene dynamical conductivity is negative. We found that TE plasmons are excited for angles of incidence very close to the critical angle between prism and air, as predicted from their dispersion relation. Reflection profiles and field intensities of these waves are presented for $\mu = 0.2$, 0.3 eV.

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