Surface plasmons in the new generation of low dimensional materials: full wave modelling through linear response density functional theory

M. Gravina, A. Sindona, M. Pisarra, C. Vacacela, G. Falcone

Dipartimento di Fisica, Università della Calabria, Cubo 30C, 87036 Rende (CS), Italy
gravina@fis.unical.it

Abstract

Dielectric properties of low dimensional graphene-based materials are attracting much attention due to the fast development of experimental platforms in which plasmons are generated and controlled [1-4]. A reliable theoretical framework is needed in order to develop innovative technological solutions for high-performance next-generation nano-devices, integrating graphene with conventional silicon-based devices, and find the fundamental limits for functional graphene materials nano electronics.
Here, we present the plasmonic responses of graphene nanoribbons, silicene and germanene, both in their free-standing and adsorbed forms on supporting substrates. The calculations are performed by density functional theory within the linear response regime. This full wave modelling improves the usual semi-phenomenological descriptions available in the literature.

References

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