

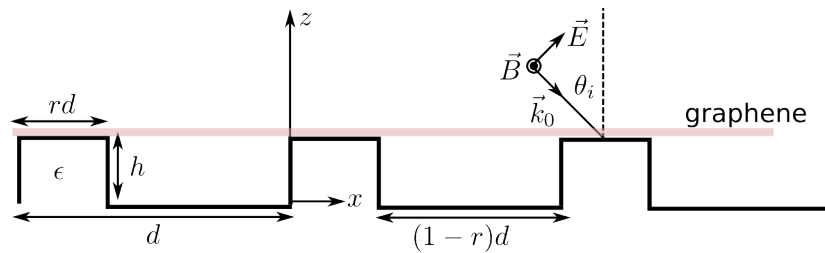
# Exact solution for square-wave grating covered with graphene: Surface plasmons-polaritons in the THz range

N. M. R. Peres<sup>1</sup>, Yu. V. Bludov<sup>1</sup>, Aires Ferreira<sup>2</sup>, and M. I. Vasilevskiy<sup>1</sup>

(1) Department of Physics and Center of Physics, University of Minho, Campus de Gualtar, P-4710-057, Braga, Portugal

(2) Graphene Research Centre and Department of Physics, National University of Singapore, 2 Science Drive 3, Singapore 117542

**Abstract:** We provide an analytical solution to the problem of scattering of electromagnetic radiation by a square-wave grating with a flat graphene sheet on top (see figure). We show that for deep grooves there is a strong plasmonic response with light absorption in the graphene sheet reaching more than 45%, due to the excitation of surface plasmon-polaritons. The case of grating with a graphene sheet presenting an induced periodic modulation of the conductivity is also discussed.



**Figure:** Geometry of the problem. The incident angle and the incoming wave number are depicted. The radiation is  $p$ -polarized. A top gate for the electrostatic doping of graphene can be arranged as a transparent electrode placed at some distance above the graphene sheet. Alternatively, a bottom gate can be placed below the dielectric substrate.

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