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Tunable gap graphene micro-ribbons for terahertz plasmonics DANHONG HUANG, Air Force Research Laboratory, Space Vehicles Directorate, Kirtland Air Force Base, NM 87117 USA, GODFREY GUMBS, OLEKSIY ROSLYAK, Department of Physics and Astronomy, Hunter College of the City University of New York, 695 Park Avenue, New York, NY 10065 USA — Maxwell's equations are solved for an array of graphene micro-ribbons located at the interface between a vacuum half-space and a half-space of a dielectric substrate. Our calculations are include mode-mixing in the optical-response function. A closed-form analytic expression is obtained for the nonlocal optical-response function of a graphene layer with an induced energy gap which is then employed in our calculations beyond the long-wavelength approximation. Both the reflectivity and transmissivity spectral functions are calculated. Specifically, we obtain their dependences on the period of the array, the ribbon width, chemical potential of doped graphene, energy gap between the valence and conduction bands, substrate refractive index, and incident angle of a plane-wave electromagnetic field. Additionally, a qualitative comparison is made between our calculated results in this paper and the recent experimental data given by Ju, *et al.*, [Nature Nanotechnology, **6**, 630 (2011)].

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