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Dielectric Screening Response of a Plasmonic "Sandwich" N.J.M. HORING, Department of Physics and Engineering Physics, Stevens Institute of Technology, Hoboken, NJ 07030 , GODFREY GUMBS, DIPENDRA DAHAL, Department of Physics and Astronomy, Hunter College, CUNY, New York, NY 10065, ANDRII IUROV, Center for High Technology Materials, University of New Mexico, Albuquerque, NM 87106 — We have formulated the RPA integral equation for a system composed of two identical semi-infinite metallic plasmas with planar bounding surfaces at z = $\pm d/2$. The gap between the two metallic bulk plasmas contains a two-dimensional semiconductor plasma at z=0. This equation for the inverse dielectric function is solved analytically in position representation for a narrow gap, yielding an explicit formula for the inverse dielectric screening function in terms of the nonlocal 2D semiconductor polarizability and the bulk metallic polarizability, the latter well approximated in the local limit. Based on this solution, we have evaluated the nonlocal plasmon dispersion relation computationally, taking Graphene as the 2D semiconductor plasma. The associated nonlocal Graphene plasmon spectrum coupled to the sandwich system is exhibited in 3D plots, which show a linear mode and another displaced from the bulk plasma frequency.

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