localization of plasmonic excitations in graphene induced by nanoscale potential

JUNG-JUNG SU, Theoretical Div., Los Alamos Natl. Lab.,
HARI DAHAL, American Physical Society, RODRIGO MUNIZ, STEPHAN HAAS,
Dept. of Phys. and Astro., Univ. of Southern California, ALEXANDER V. BAL-
ATSKY, Theoretical Div., Los Alamos Natl. Lab. — The near-ballistic transport
property at close to room temperature makes graphene a strong candidate for inte-
grated nanoelectronic application. Graphene-based plasmonics is one of the devices
proposed that integrate electronic and light transport. By utilizing localized plas-
monic excitation, plasmonics can transport light with a sub-wavelength dimension.
We report our calculation on plasmonic excitation induced by different local struc-
tures. The polarization obtained by random-phase-approximation (RPA) is diag-
onalized to extract plasmon modes. We have also studied the effect due to gating
and due to tuning of local potential structure geometry. These prediction can be
tested by scanning tunneling microscope and is important both in fundamental and
in application aspects.