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Title

Edge and waveguide terahertz surface plasmon modes in graphene microribbons

Source

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Abstract

Surface plasmon modes supported by graphene ribbon waveguides are studied and classified. The properties of both modes with the field concentration within the ribbon area (waveguiding modes) and on the edges (edge modes) are discussed. The waveguide and edge modes are shown to be separated from each other by a gap in wave numbers. The even-parity hybridized edge mode results to be the fundamental electromagnetic mode of the ribbon, possessing also the lowest losses. All of the plasmonic modes in the ribbons have an optimum frequency, at which the absorption losses are minimum, due to compromise between the plasmon confinement and the decrease of the group velocity close to the modal cutoff. The presented results show that the diffraction limit in graphene ribbons can be surpassed.