ORAL DEFENCE ANNOUNCEMENT

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NOVEL PLASMONIC INTERACTION AND MANIPULATION IN 2D MATERIALS

Recently, ignited by the pioneer work in the area of graphene plasmonics, plasmonics with two dimensional (2D) materials which are atomically thin materials bonded by weak van der Waals interaction has gain considerable research interests. We study the novel interactions and manipulations of 2D plasmons which feature their exotic optical properties drastically different from their three-dimensional bulk counterparts, as well as the feasibility to be tuned through external modification such as chemical doping and electrical gating. In particular, we derive a full analytical solution of the optical response of a graphene-coated cylindrical dimer, and show a polarization independent broadband spectrum, as well as multi-frequency Fano dips, in contrast to its metallic counterparts. We further explore the negative fraction of extremely squeezed polaritons in nanostructured and natural hyperbolic 2D materials. At last, we demonstrate a directional waveguide design based on two inversely biased graphene sheets. The proposed work is significant in demonstrating 2D material as a versatile platform for nanophononics applications from several aspects and providing physical insight through comprehensive theoretical study.

Date: 23 MAY 2019
Time: 10AM
Venue: Conference Room, Research & Graduate Studies Office, Level 2, SPMS
Supervisor: Assoc Prof Zhang Baile