



# THE UNIVERSITY OF CHICAGO

## COMPUTATIONAL AND APPLIED MATHEMATICS COLLOQUIUM

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### Electromagnetic Waves on Two-dimensional Materials: A Flavor of Dispersion and Homogenization in Plasmonics

THURSDAY, February 28, 2019, at 4:00 PM  
Jones 226, 5747 South Ellis Avenue

#### ABSTRACT

In the last decade, remarkable advances have been made in the design and fabrication of two-dimensional (2D) materials with novel electronic structure. Celebrated examples include graphene and black phosphorus. These systems may enable the generation and propagation of fine-scale electromagnetic waves, called surface plasmon-polaritons (SPPs). These waves result from the strong coupling between the incident light and the electron plasma of the material, and are promising tools in application areas such as nanophotonics, sensing and imaging.

In this talk, I will discuss the following problems related to SPPs via solutions of time-harmonic Maxwell's equations. (i) The dispersion of SPPs along edges of 2D materials by use of the Wiener-Hopf method. (ii) The homogenization of layered, periodic structures of 2D materials ("plasmonic crystals"). An appealing, emergent property in topic (ii) is the possible propagation of macroscopic waves with almost no phase delay ("epsilon-near-zero" effect).

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#### Organizers:

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CAM Colloquium URL: <https://cam.uchicago.edu/seminars/colloq/index.shtml>.

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