

SPECIAL APPLIED MATH SEMINAR: Wednesday, February 19, at 3:30pm in WWH 1314

TITLE: Plasmonics on 2D materials: Flavors of dispersion and homogenization

SPEAKER: Dionisios Margetis, Univ of Maryland

ABSTRACT:

In the last decade, research advances in the design and fabrication of 2D materials such as graphene and black phosphorus have rapidly evolved into a rich field at the crossroads of several applied disciplines. These systems may allow for the propagation of fine-scale electromagnetic waves, called surface plasmon-polaritons, which can challenge the typical diffraction limit.

In this talk, I will discuss recent theoretical progress in understanding how geometry, e.g., the presence of edges as well as the formation of periodic layered structures with conducting 2D materials, may affect electromagnetic wave propagation. To this end, I will formulate and solve physically inspired boundary value problems for the time-harmonic Maxwell equations. Emphasis will be placed on the possible existence and dispersion of edge modes on flat, anisotropic conducting sheets. A key ingredient of my approach is the solution of corresponding integral equations of the Wiener-Hopf type for the electric field. I will discuss an emergent topological aspect of this formalism and its physical implications.