1159-65-156 **Matthias Maier*** (maier@math.tamu.edu). *Finite-element computation of the conductivity feedback of nanoscale optical devices.*

In the terahertz frequency range, the effective (complex-valued) surface conductivity of atomically thick 2D materials such as graphene has a positive imaginary part that is considerably larger than the real part. This feature allows for the propagation of slowly decaying electromagnetic waves, called surface plasmon-polaritons (SPPs), that are confined near the material interface with wavelengths much shorter than the wavelength of the free-space radiation. SPPs are promising ingredients in the design of novel optical applications promising "subwavelength optics" beyond the diffraction limit. There is a compelling need for controllable numerical schemes which, placed on firm mathematical grounds, can reliably describe SPPs in a variety of geometries.

In this talk we present an a finite element approach for the simulation of the nanoscale conductivity response of complex optical devices with nanoscale 2D material inclusions. The approach is based on a homogenization theory of layered optical heterostructures. We conclude by shortly describing a spectral analysis of the underlying cell problem that quantitatively describes resonances in the effective material parameters of plasmonic crystals. (Received August 03, 2020)