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Title:
Nanoscale imaging with RF sensors

Monica Allen,
Stanford University

Abstract:

Although the wavelength of microwaves far exceeds the nanoscale, it is possible to use an RF sensor to perform nanoscale imaging by confining electromagnetic fields to small spatial dimensions. In this talk, I will discuss microwave impedance microscopy (MIM), a near-field imaging tool that spatially visualizes the local conductivity and dielectric constant of a material with nanoscale precision. We have used MIM to image edge currents in topological insulators, a rapidly expanding class of semiconductor materials that exhibit novel transport behavior such as conductance quantization and suppressed backscattering. Finally, I will outline how MIM could be used in the future to image and manipulate topological Majorana modes, an emerging platform for quantum information processing.

Biography:

Monica Allen is a Karel Urbanek Postdoctoral Fellow in the Applied Physics Department at Stanford University.

She currently develops new electromagnetic imaging tools to probe emerging materials and nanoelectronic devices in the GHz regime.

Monica completed her B.A. and Ph.D. in Physics at Harvard University, where she created novel nanofabrication techniques to visualize and confine the flow of electrons in graphene.

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