NORTHWESTERN UNIVERSITY'S DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING PRESENTS:

2021 MSE SPRING SEMINAR SERIES

Stephanie Law

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Prof. Law is an Associate Professor in the department of Materials Science and Engineering at the University of Delaware with an affiliate appointment in the Department of Physics and Astronomy. She co-directs the UD Materials Growth Facility and is an Associate Editor for the Journal of Vacuum Science and Technology. She received her B.S. in Physics from Iowa State University and her Ph.D. in Physics from the University of Illinois Urbana Champaign. She then held a postdoctoral position in the Electrical Engineering department at Illinois before moving to Delaware. Prof. Law has won the North American Molecular Beam Epitaxy Young Investigator award, the Department of Energy Early Career award, the AVS Peter Mark Memorial Award, the International Conference on Molecular Beam Epitaxy Young Investigator Award, and the Presidential Early Career Award for Scientists and Engineers (PECASE).

Photons, plasmons, and polaritons: optical phenomena in complex materials

When light interacts with complex materials, we can excite a variety of modes including plasmon polaritons and optical phonons. In layered materials, these modes can interact with each other to produce hybrid excitations resulting in novel optical phenomena such as negative refraction, extreme light confinement, and preferential thermal emission. In this talk, I will first discuss our work on the growth of topological insulator thin films and heterostructures by molecular beam epitaxy. Topological insulators have two-dimensional surface states that house massless electrons, and the plasmon polaritons in these materials show unusual properties. I will discuss the dispersion of these modes and show record high mode indices and extremely long polariton lifetimes. Using MBE, we can then grow layered structures comprising multiple topological and normal insulators, resulting in hybrid coupled plasmon modes. I will close by discussing our work on semiconductor hyperbolic metamaterials, which are layered materials comprising alternating metallic and dielectric materials. I will show our work demonstrating negative refraction in these materials as well as their ability to house their own complex plasmon polariton modes and show preferential thermal emission.

Thursday, May 6 • 4 PM CDT • Zoom

Registration is required. RSVP link.

Questions? Contact Kristina.lugo@northwestern.edu.