

UC SAN DIEGO NANOENGINEERING SEMINAR

Tuesday, March 13, 2018

Seminar Presentation: 11:00am - 12:00pm

Henry Booker Conference Room, Jacobs Hall

“Coupling Photon Spins with Electron Spins in Opto-Spintronic Devices”

Mo Li

*Associate Professor, Department of Electrical and Computer Engineering
University of Minnesota*

Abstract: Optoelectronic devices directly couple and convert photons and electrons for communication, computation, and imaging. An emerging category of photonic devices, opto-spintronic devices, instead, couple photons with the spin of the electron in quantum materials. They could provide an efficient interface between optical communication and spintronics systems in the post-Moore era of computation and communications. In this talk, I will discuss the role of photons' spin angular momentum in integrated photonics devices and show two types of opto-spintronic devices that directly couples photon spins with electron spins in quantum materials. In the first device, we show that photons in a waveguide with transverse spin angular momentum (tSAM) can generate a directional, spin-polarized photogalvanic current in a topological insulator. In the second device, we show that ultrafast optical pulses can directly switch a magnetic tunnel junction at a sub-picosecond timescale.

Biosketch: Mo Li is an Associate Professor in the Department of Electrical and Computer Engineering at the University of Minnesota, where he joined the faculty in 2010. From 2007 to 2010, he was a postdoctoral associate in the Department of Electrical Engineering at Yale University. He received his Ph.D. degree in Applied Physics from Caltech in 2007, B.S. degree in Physics from USTC in 2001. His distinctions include an NSF CAREER Award in 2014, McKnight Land-Grant Professorship in 2013 and AFOSR Young Investigator Award in 2012. His current research areas include nanophotonics, nano-optomechanical systems (NOMS), 2D material optoelectronics, opto spintronics and quantum photonics.