

Colloquium Notice

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Imaging Landau Quantized Polaritons Through Nano-light

Subwavelength confinement, chiral sensing, and frequency conversion of light at the nanoscale are highly desirable for future photonic and optoelectronic applications of quantum materials. By breaking the time-reversal symmetry, magnetic field enables novel light-matter interactions with important real-space features such as chiral magnetopolaritons, unidirectional edge photocurrent, and nonreciprocal light propagation at magnetic interfaces. However, due to many technical difficulties, these important magneto-optical phenomena and their applications at the nanoscale have not been investigated in real space at infrared (IR) or terahertz (THz) frequencies. In this talk, I report a direct visualization of the infrared magnetoexciton polaritons due to quantized Landau transitions in near-charge neutral graphene, using a novel magneto scanning near-field optical microscope (m-SNOM) working in a magnetic field up to 7 Tesla. We map the magnetic field-dependent polariton excitation and propagating at the edge of graphene and hBN and explore its associated enhanced chiral edge photocurrent down to the quantum Hall region. Our approach establishes m-SNOM as a versatile platform for exploring magneto-optical effects at the nanoscale. This preliminary research sets the stage for future spectroscopic investigations of the topological and chiral photonic phenomena in complex quantum materials using low-energy photons.

Mengkun Liu (Ph.D. 2012 Boston University) is an associate professor at the Department of Physics and Astronomy of Stony Brook University (since Jan. 2015). His post doc research was at UC San Diego from 2012-2014. His research interests include physics of correlated electron systems, low-dimensional quantum materials, infrared and terahertz nano-optics and ultrafast time-domain spectroscopy. Prizes include NSF career award (2021) and Seaborg Institute Research Fellowships at Los Alamos National Lab (2009, 2010).

Monday

May 22, 2023

Starts at 12:15 PM

Coffee at 12:00 PM

Physics Conference Room, SB B326

This talk is accessible via [Zoom](#) or use

meeting ID 829 2687 2594 and **passcode 866995** to join

Physics Department of Queens College, 6530 Kissena Blvd, Queens, NY 11367 <https://physics.qc.cuny.edu>