Physics
AT QUEENS COLLEGE

Colloquium Notice

Alexander Khanikaev

City College, CUNY

Topological photonics and polaritonics

The past decade has witnessed a dramatic shift in our understanding of quantum and classical wave phenomena triggered by the discovery of topological states of matter. Unprecedented new phenomena, such as dissipationless and reflectionless transport, enabled by topology have sparked a tremendous interest in this subject and research activity across different fields, from condensed matter to acoustics and photonics. In this talk, focusing primarily on the works of my group, I will give a brief introduction to topological photonics and a historical perspective on how this field evolved leading to the latest advances and new exotic states of light and matter. Starting with analogies between classical wave systems and quantum condensed matter systems, I will show how topologically robust spin-polarized transport can be realized in photonic systems. Next, I will discuss the topic of higher-order photonic topological insulators and peculiarities specific to such systems that are not present in their condensed matter counterparts. Finally, I will show that by mixing topological photons with excitations and quasiparticles of solid-state systems one obtains a powerful platform for controlling light-matter interactions. In particular, an emergence of topological polaritons – half-light half-matter excitations – in Van der Waals materials, including valleys polarized topological exciton-polaritons in transition metal dichalcogenides and topological phonon-polaritons in hexagonal boron nitride (hBN), will be discussed.

Monday
March 4, 2024
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