PRITZKER SCHOOL OF MOLECULAR ENGINEERING

SPECIAL QUANTUM SEMINAR

Engineering plasmonic fields for quantum free-electron-light interactions and novel light topologies

WHEN:
Tuesday, June 21st
10:00 – 11:00 AM (CST)

WHERE: ERC 201B & Virtual
https://uchicago.zoom.us/j/97924722271?pwd=Qk84eUhDS21Pc1VyUkZJRHJFRXh4dz09
Meeting ID: 979 2472 2271
Passcode: 688142

HOST:
Prof. Hannes Bernien

Shai Tsesses
Technion – Israel Institute of Technology

When strongly confined, electromagnetic waves have inseparable spin and orbital angular momenta. This trait gives rise to a myriad of phenomena, collectively known as "the spin-orbit interaction" (SOI) of light. I will present our progress in using the SOI of light for controlling plasmonic fields, attempting to discover novel applications and fundamental properties of electromagnetic waves. On the fundamental side, we were able to observe a skyrmion topology in the electromagnetic field - a phenomena occurring only in a handful of material systems and holds promise for magnetic information processing. On the application side, we provided the first realization of tunable photo-induced spatial modulation of free electrons, controlling their shape by changing the distribution or intensity of the near-field they interact with. I will also touch upon some of our newer projects, dealing with the 4D topology of 2D quasi-periodic plasmonic lattices and the spontaneous emission of surface plasmon polaritons by free electrons.