April 4th, 2022 10:00 AM
QED & Materials seminar
Marios Michael

Title
“Anomalous THz emission in striped cuprate superconductors"

Abstract
In this talk I will discuss the theory behind recent experimental observations in cuprate LBCO by Andrea Cavalleri's group. High frequency pumping of striped superconductors leads surprisingly to very low frequency emission in the THz region. I will describe how the interplay of both stripes and superconductivity leads to a nonlinear process which excites coherent surface Josephson plasma oscillations. Surface oscillations plasmons which are typically dark and lie outside the light cone, become bright due coupling to the stripe order.

On the technical level, I will discuss hybrid approaches where the non linear optical response of electrons can be taken into account from first principles, and feeds into a more phenomenological model for the collective mode dynamics in the THz region of striped superconductors. I will stress the significance of surface phenomena when addressing this type of high to low frequency down conversion, due to length scale mismatch between excitations in the two frequency ranges.

On a physical level, I will describe how the presence of such an emission can have profound implications to the stripe pattern of striped superconductors and the existence of the elusive pair density wave. [1,2,3]

[1] arXiv:2111.14904
[2] arXiv:2112.05772
[3] arXiv:2203.04687