Speaker: Frank KOPPENS (ICFO, Spain)

Title: **Quantum nano-optoelectronics of twisted 2D materials**

Abstract: Two-dimensional (2D) materials have emerged as a fascinating platform for manipulating light and exploiting light-matter interactions at the atomic level. Twisted 2D materials, in particular, have represented a recent revolution in materials science as a tunable platform to tailor the periodic energy landscape for electrons at the nanoscale. This has led to the demonstration of tunable superconductivity, novel topological polaritons, tunable magnetism, etc.

We present innovative techniques to study the nano-optoelectronic properties and to develop novel quantum technologies. Our pioneering low-temperature near-field imaging techniques allow us to examine the electronic response to light with unprecedented nanometer-scale spatial resolution. One of our key interests is to unveil the interplay of topological and many-body phenomena in 2D-material heterostructures. Moreover, we present the discovery completely new functionalities, such as single-photon detection capabilities.