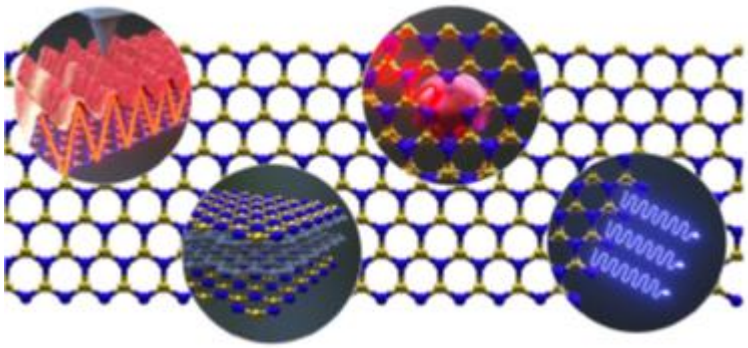
Special Seminar

Wednesday, 25 May 2022
2 pm
ZNN, Seminar room EG 0.001
also ONLINE via ZOOM

"Quantum nanophotonics with hexagonal Boron nitride"

Engineering robust solid-state quantum systems is amongst the most pressing challenges to realize scalable quantum photonic circuitry. While several 3D systems (such as diamond or gallium arsenid) have been thoroughly studied, solid state emitters in two dimensional (2D) materials are still in their infancy.
In this presentation I will discuss the appeal of an emerging van der Waals crystal – hexagonal boron nitride (hBN). This unique system possesses a large bandgap of ~ 6 eV and can host single defects that can act as ultra-bright quantum light sources. In addition, some of these defects exhibit spin dependent fluorescence that can be initialised and coherently manipulated. In this presentation I will discuss in details various methodologies to engineer these defects and show their peculiar properties. Furthermore, I will discuss how hBN crystals can be carefully sculpted into nanoscale photonic resonators to confine and guide light at the nanoscale. Taking advantage of the unique 2D nature of hBN, I will also show promising avenues to integrate hBN emitters with silicon nitride photonic crystal cavities.
All in all, hBN possesses all the vital constituents to become the leading platform for integrated quantum photonics. To this extent, I will highlight the challenges and opportunities in engineering hBN quantum photonic devices and will frame it more broadly in the growing interest with 2D materials nanophotonics.



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