

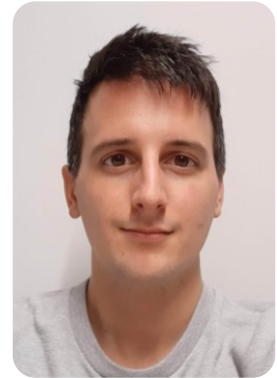
## SFB – Colloquium

Speaker: **Dr. Luca Sortino**

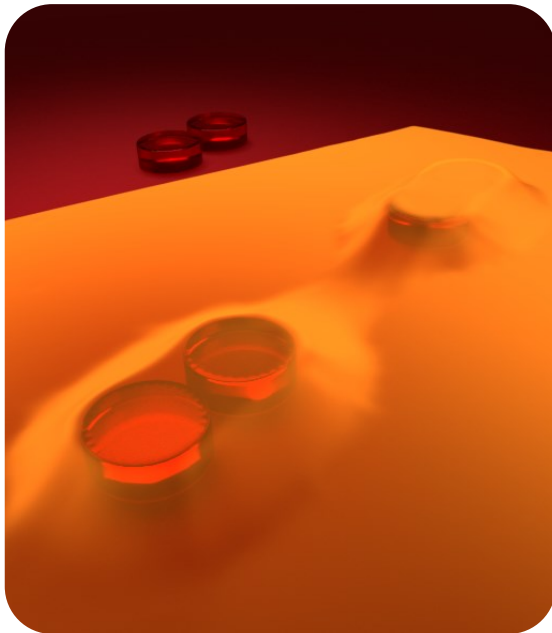
Nano-Institute Munich, LMU Munich

Date: Tuesday, 14 June 2022, 14:15, H34

Topic: All-dielectric nanophotonics with Transition Metal  
Dichalcogenides semiconductors



Abstract:



Artistic representation of an atomically thin semiconductor monolayer of  $\text{WSe}_2$  transferred on top of dielectric GaP optical nanoantennas for enhanced light-matter interaction and strain-engineering.

High refractive index dielectrics emerged as an exciting nanophotonic platform to shape and control electromagnetic fields at the nanoscale, offering a toolbox for tailoring light-matter interaction of solid-state quantum emitters via optical Mie resonances in sub-wavelength nanoantennas. Van der Waals (vdW) materials, such as the family of Transition Metal Dichalcogenides (TMDs), are a powerful system to investigate light-matter interaction at the nanoscale, exhibiting exceptional optical properties in their atomically thin monolayer form, with tightly bound excitons, light-valley interactions, and single-photon emitters. Moreover, in their bulk form, TMDs exhibit large refractive indexes ( $n > 4$ ) and strong optical anisotropy, making them a favorable candidate for the realization of low-losses optical resonances in all-dielectric TMD nanophotonic structures. In this talk, I will show how coupling TMD monolayers of  $\text{WSe}_2$  with Mie resonances in dielectric nanoantennas opens to the nanoscale positioning and quantum efficiency enhancement of native strain-induced single-photon emitters, and introduce how nanophotonic structures, made exclusively of vdW materials, open to a plethora of possibilities for tailoring light-matter interaction of integrated quantum light sources.

Host: Prof. Dr. John Lupton