Felicitats al nou graduat de doctorat de l'ICFO

El Dr. Adeel Afridi s'ha graduat amb una tesi titulada ?Reconfigurable metasurfaces based on thermos-optical and optomechanical controls'

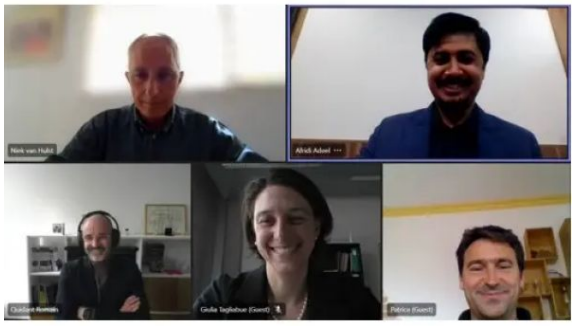
April 28, 2023

Felicitem el Dr. Adeel Afridi que avui ha defensat la seva tesi online.
El Dr. Afridi va obtenir el seu master en Enginyeria Electrica i Electronica per la Koc University of Istambul. Es va unir a l'ICFO com a estudiant de doctorat al grup de recerca Plasmon Nano-Optics dirigit pel professor Romain Quidant. La tesi del Dr. Afridi titulada ?Reconfigurable metasurfaces based on thermos-optical and optomechanical controls' ha estat supervisada pel professor Romain Quidant.

RESUMEN
Optical metasurfaces established themselves as potential platform for planar and integrated optics. Progress in the material sciences and fabrication process paves the way towards ultra-thin metasurface based devices, also known as meta-devices. Meta-devices include

holograms, flat lenses, wave-plates, polarizers and deflectors. Amongst these meta-devices, great effort focuses toward the development of high performance, aberrations-free, and multi-functional metalenses.
High refractive index and lossless dielectric materials have enabled metalenses with near-unity transmission and high numerical aperture. However, the static nature of metalenses limits their use for the applications where continuous and on demand tunability of lens operation is required such as imaging and adaptive vision.
In this thesis, I developed two different techniques to achieve reconfigurability in metasurfaces which I used to create reconfigurable metalens devices. devices based on two types of reconfigurability techniques. First technique achieves focal
length tunability of a dielectric metalens by utilizing the electro-thermo-optical effect to change the refractive index of the surrounding media. The electro-thermo-optically controlled metalens exhibits linear and continuous focal length tunability, high efficiency and low power consumption with switching time of the order of 100 ms. The second varifocal metalens Device takes advantage of the optomechanial effect to introduce change in the geometry of the metalens itself. Carved onto a freestanding ultra-thin silicon membrane, the metalens exhibits continuous and linear focal length tunability with fast response time as short as a few ?s.

Comissio de Tesi:
Prof. Dr. Niek van Hulst, ICFO
Prof. Dr. Giulia Tagliabue, Ecole Polytechnique federale de Lausanne (EPFL)
Dr. Patrice Genevet, CRHEA -Centre de Recherche sur l'Hetero-Epitaxie et ses Applications



Comissio de Tesi

Dr. Adeel Afridi en defensa de tesi en linia