Postdoc Position in Phononic Architectures

The candidate will join the team led by Agustín Mihi within the HORIZON-EIC-2021-PATHFINDEROPEN project DYNAMO (*Dynamic Spatio-Temporal Modulation of Light by Phononic Architectures*). Dr. Mihi's team is part of the Nanostructured Materials for Optoelectronics and Energy Harvesting (NANOPTO) group, which is generally devoted to materials for energy and photonic applications.

Imaging technologies form the basis of a vast range of products and devices and improvements would have a huge impact both scientifically and commercially. We have identified a key bottleneck, how light is modulated in the imaging system, that we can unlock to achieve a new paradigm in imaging technologies. Spatial light modulators, and similar components, operate sequentially: the light beam is shaped in different patterns but the time interval between patterns is limited by the refresh rate of the device. We will remove this limitation, thereby creating a technological breakthrough; our advance will be to send all possible patterns of the device simultaneously, and encoded in a short nanosecond pulse, creating the concept of parallel beam shaping or dynamic spatio-temporal light modulation device. In Dynamo, we will shape optical beams in two spatial dimensions plus the temporal one. Dynamo is an ambitious and integrated project that begins by studying the fundamentals of acoustic wave scattering and ends by developing ultra-fast imaging applications in optics. The success of this pathway requires the synergy of the disciplines of physical acoustics, photonics and imaging. The outcomes from this project offer to accelerate imaging technologies and place European science and industry at the forefront of the inventions and advances that will follow.

Main tasks of the candidate

The main tasks that will be carried out within the project include:

a) Fabrication and optimization of different nanostructures exhibiting photonic and phononic properties (*cleanroom experience valued*)
b) Design and building optical set ups for the optical characterization of the nanostructures. Fundamental study/characterization of materials and devices using, e.g. advanced spectroscopy.
c) Experience modelling optical properties of nanostructures via FDTD (*Comsol, Lumerical, etc*)

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Requirements

We look for an enthusiastic researcher familiarized with the fields of photonics/plasmonics and:

- PhD in Materials Science, Nanoscience, Physics or similar subjects.
- A good level of written and spoken English.
- Optical setups know-how and optical spectroscopy background.
- Nanofabrication experience, knowledge of vacuum and cleanroom work environments.

About The Nanostructured Materials for Optoelectronics and Energy Harvesting Group

The Nanostructured Materials for Optoelectronics and Energy Harvesting (**NANOPTO**) research group focuses on producing and characterizing advanced semiconducting structures with the main objective of understanding their fundamental behavior in order to tailor and improve their functionalities and empower different applications in the areas of optoelectronics, energy-related, and sensing devices.

In particular, Dr. Mihi's team focusses mainly on three research aspects: i) the investigation of the fundaments behind the enhanced light-matter interaction observed in devices that use wave optics components; ii) the development of fabrication routes for large area and low cost photonic and plasmonic structures using techniques similar to those employed in industry, so they could be easily incorporated in technologies such as roll to roll; and iii) the fabrication and characterization of prototype solar cells, photodetectors and sensors based in photonic architectures, demonstrating improved performance without deterioration of other figures of merit in the device.

Dr. Mihi's research line relies on unconventional nanofabrication to produce photonic architectures with exciting optical properties easily incorporated into large area devices. They have the capabilities to design photonic nanostructures for each device type using current numerical simulation tools. They combine soft nanolithography, transfer printing and industry compatible fabrication approaches to integrate the architectures as part of the optoelectronic devices. Finally, they characterize optically and electrically the enhanced prototypes employing state of the art spectroscopic equipment.

We value a diverse and inclusive work environment where all team members have excellent opportunities for learning and contributing. For more information, please visit:

https://nanophotonics.icmab.es

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About ICMAB

The Institute of Materials Science of Barcelona (ICMAB-CSIC) is a multidisciplinary research center focused on cutting-edge research in functional advanced materials in the fields of ENERGY, ELECTRONICS, NANOMEDICINE and application fields yet to imagine.

The ICMAB is integrated within the Barcelona Nanocluster in Bellaterra (BNC-b), a research network that includes the UAB, the CSIC (ICMAB, IMB-CNM and ICN2) and IRTA, part of the UAB Research Park of the Universitat Autònoma de Barcelona (PRUAB) and the ALBA Synchrotron. The BNC-b aims to share advanced scientific equipment and promote and disseminate nanoscience and nanotechnology.

The ICMAB offers a complete range of scientific services, including a 10,000 class cleanroom (the Nanoquim Platform) that are open to interested parties, whether these are academic or from industry, and it participates in all kinds of educational and promotional activities. Many ICMAB researchers teach at the UAB Master's degree in Nanotechnology and Materials Science and also on the UAB degree on Nanoscience and Nanotechnology.

https://icmab.es/

Details of the position

Contract (full time) duration for 2 years, within the EIC Pathfinder project DYNAMO
Tentative Starting date: January-February 2024
Further information (contact person): Dr. Agustín Mihi, agustin.mihi@csic.es

How to apply

Interested candidates should send by email to Dr. Agustín Mihi (agustin.mihi@csic.es) the following documents:

- motivation letter (where you introduce yourself, previous experience in relation to the post and future goals)
- detailed CV, including the academic record, and a list of references with contact details

Closing date for application: The recruitment process will be closed on October 30th or when a suitable candidate is found.
However, in the interest of gender equality, this may be extended until the ratio between female and male applicants is reasonable.

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