

This Master project will investigate the electron-induced light emission from single molecules and graphene nanoribbons at the nanoscale. The master student will use a low temperature scanning tunneling microscope (STM) for exciting luminescence-like process in individual molecular systems and studying the mechanisms leading to light emission. The systems to study are hybrid graphene nanostructures fabricated with atomic precision on metal substrates, and represent the state of art in molecular nanostructures.

In STM, a current of tunneling electrons between a sharp tip and a surface is used for obtaining atomic scale images of surfaces and adsorbates. Electrons tunnelling through quantum structures such as molecules and one-dimensional ribbons can also induce optical transitions, which result in the emission of characteristic light. The spectral analysis of the emitted (visible) photons carries information about the electrons confined in the nano-object, and about the mechanisms for electron tunneling through the nano system.

The **project** involves fabrication and inspection of molecular systems, transport measurements to resolve electronic channels, resonances, and optical measurements using an optical spectrometer coupled to the experimental set up. The results obtained are expected to provide a physical picture describing the interaction of light and matter at length scales much smaller than the photon-wavelength.

This Master project is **offered** for students interested in experimental physics and optics. She/he will be part of the nanoimaging research group in annaogune, investigating atomic scale spectroscopy of surfaces and atomic/molecular nanostructures using scanning probe methods. If you are a master student and you are interested in this project, please get in touch with Nacho Pascual (ji.pascual@nanogune.eu).

To **apply** for a master scholarship fill in the form below and follow the instructions and recommendations of the general call open until 30 June 2021.

NOTES:

(i) All applicants will receive an answer after the end of the selection process; but please note that due to the large number of submissions that are expected, we cannot provide individual feedback.

(ii) Additional information about nanoGUNE's commitment towards HR excellence in Research and Gender Equality are available on our website.

(iii) We encourage you to subscribe to our HR mailing list to receive information related to nanoGUNE's open positions and open calls for different training and talent attraction programs.