Post-doc position

Single Graphene Quantum Dots for Quantum Technologies

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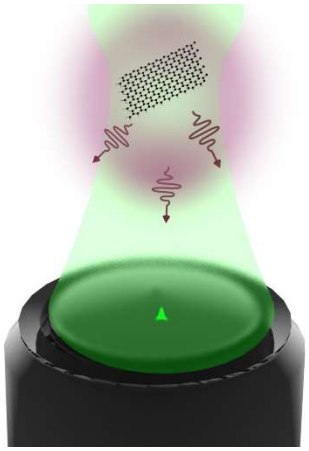

Over the last few years, the development of new single-quantum emitters has been a fast-growing field of research. Such emitters should share essential qualities: tunability, brightness, photostability, the possibility of electrical injection, optically detected spin, etc.

In this context, graphene quantum dots (GQDs) have many assets. The perfect control of their size, symmetry and edge shape, provided by bottom-up synthesis, offers a wide range of tunable properties. The understanding and mastering of these properties will open the way toward Swiss-knife emitters with well-defined functionalities.

In this context, the present project aims at studying a new class of single GQDs. Of specific interest will be to address their spin properties optically, a property yet ignored while central for quantum sensing or the development of spin-photon interfaces.

This project will take advantage or our recent efforts to address the photophysics of GQDs at the single-molecule level [1, 2, 3]. Indeed, over the last year, we demonstrated that, first, GQDs are very bright, photostable quantum emitters with excellent single-photon purity at room temperature. Then, we highlighted that their properties could be tuned by choice of an appropriate GQD structure.

The hired postdoc will lead the study of the photophysics of a new class of GQDs [4], with various sizes and symmetries, developed with chemist close-collaborators in the framework of two ANRs grants. She/He will focus on single molecule spectroscopy, and the observation and characterization of spin properties of these novel GQDs. He/She will work closely with PhD students and will be involved in discussions with collaborators from theory and chemistry syntheses.

References :
[1] S. Zhao et la, Nature Com 9, 3470 (2018)
[2] T. Liu et al, Nanoscale, 14, 3826 – 3833 (2022)
[3] T. Liu et al, Journal of Chemical Physics 156, 104302 (2022)
[4] D. Medina-Lopez et al in preparation