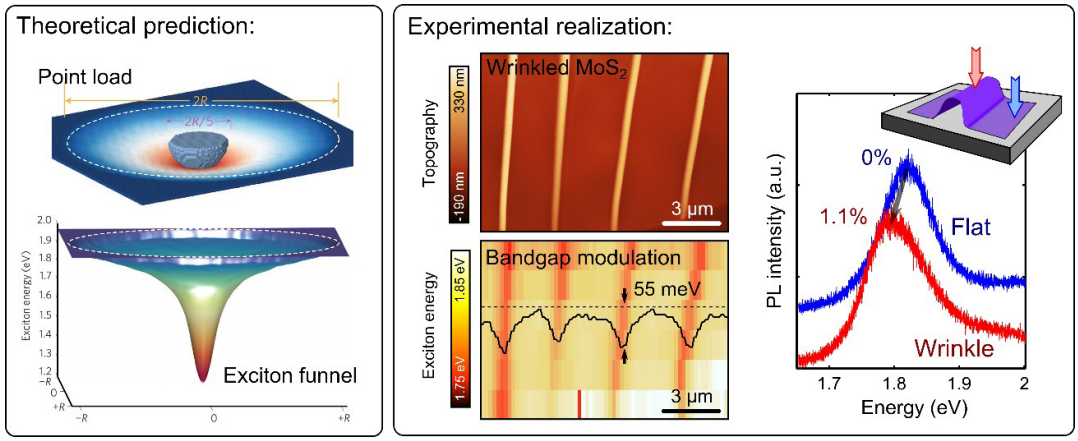
JOB OPPORTUNITY: PhD THESIS CONTRACT IN CONDENSED MATTER THEORY

Contract duration: 2 years + possible extension
Staring at the beginning of 2017

Single-photon generation in 2D crystals for quantum information



(Left) Theoretical proposal [Feng, J., Qian, X., Huang, C.-W. & Li, J. Strain-engineered artificial atom as a broad-spectrum solar energy funnel. Nat. Photonics 6, 866–872 (2012)] to fabricate an exciton funnel in a freely suspended membrane of MoS_2 by means of a point load. (Right) Experimental realization of an exciton funnel in wrinkled MoS_2.

In this PhD thesis we propose to study single-photon emission (SPE) in two-dimensional (2D) crystals from a theoretical point of view. Single-photon generation is an essential phenomenon for a variety of quantum technologies. On the other hand, 2D materials offer several advantages over more conventional materials, such as stability, scalability, accessibility, integration and outstanding stretching capabilities. Our main goals are: 1) to identify natural defects that can act as SPE in 2D crystals currently available in our labs (hBN, MoS_2, WSe_2, WS_2, phosphorene, and TiS_3 will be our main playground materials), 2) to artificially create defects in order to produce SPE with the desired characteristics in a controlled way, and 3) to address, electrically or mechanically, these systems for on-demand single-photon generation. This thesis belongs to a collaborative effort between theorists and experimentalists funded by the Condensed Matter Physics Center IFIMAC. The selected PhD student will have the opportunity to directly collaborate with experimental groups by offering them theoretical support.

Interested candidates, please contact:

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