Title : Probing the quantum properties of spin defects in 2D materials		
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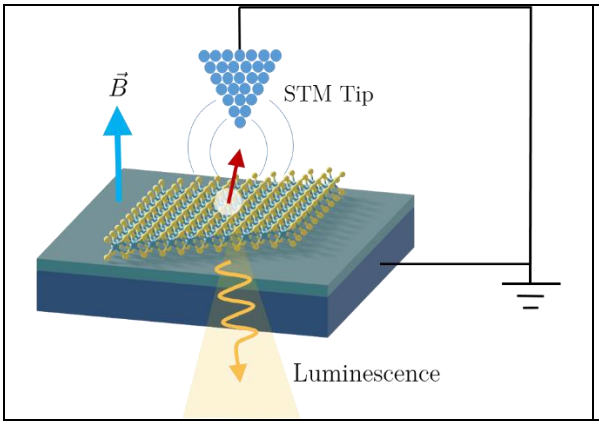
Research Area: 2D materials, semiconductor physics		
Methods: photoluminescence, scanning tunneling microscopy		

PhD track subject : Currently, one of the main research topics in condensed matter physics deals with the electronic properties of atomically thin semiconductors based on transition metal dichalcogenides (TMD), such as MoS_2 and WSe_2[1,2]. Their unique band structure provides the possibility to optically control the electron's spin and momentum by using circularly polarized light[3,4]. Since 2015, a variety of promising defects on TMD monolayers has been observed[5,6]. Some of these carry a non-zero spin, whose properties need to be understood for their use in future quantum applications. The aim of this PhD project is to fabricate 2D materials and to intentionally create spin defects at a desired density by exposing the samples to high temperatures[7]. The atomic environment of the defects and their spin properties will be studied with the help of a scanning tunneling microscope (STM) coupled with magnetic fields and luminescence detection.

The PhD track candidate will participate to this research project.



A scanning tunneling microscope (STM) is used to study the local environment and the spin properties of single defects in 2D materials such as monolayer MoS_2 and WSe_2.

References

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