

**Invited Speaker: Dr. Laurent Lombez, CNRS Research Scientist,  
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***“Spin/valley and excitonic transport in 2D-semiconductor WSe<sub>2</sub>”***

Abstract

Following the graphene craze, the scientific community is currently interested in the properties of new 2D materials that exhibit extraordinary optical and electrical properties: the family of Transition Metal Dichalcogenides (TMDs). These materials are semiconductors with a tunable bandgap that ranges from the visible to the near-infrared spectrum. It is crucial to measure the charge and spin transport properties of these materials and develop ultrathin optoelectronic and/or spintronic devices based on TMDs. In this talk, I will focus on the transport properties of WSe<sub>2</sub> monolayers using optical spectroscopy. WSe<sub>2</sub> is known to host a wide range of excitons, which are strongly bound electron-hole pairs. I will first analyze the transport properties of excitons when coupled to an electron reservoir (trionic species) and then demonstrate how it is possible to strongly spin/valley polarize the electron sea. The transport of this polarization can be carried out on a much larger scale than the classical exciton diffusion lengths, reaching up to tens of microns. Finally, I will show novel results of unidirectional excitonic transport on a coplanar WSe<sub>2</sub>/MoSe<sub>2</sub> structure.

