

Séminaire de Armando PEZO

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November 19, 2024 - 11:00 am
Room 2-A013, IJL

Theory and numerical simulations for Spin-Orbitronics



Spintronics faces current challenges and inherent difficulties for manipulating quantum mechanical features in materials. The recent discovery of the Orbital Hall effect lead to new proposals for manipulating the spin degree of freedom without heavy large-Z materials, in that sense, overcoming the scarcity of materials for developing new devices. On the other hand, graphene still appears as a recurrent source of new physics mostly related to its particular electronic properties.

In this talk, I'll give a short introduction of a new topic so-called Orbitronics whereby using numerical simulations we were able to disentangle spin and orbital-charge interconversion in $\text{Bi}_{1-x}\text{Sb}_x$, I'll comment as well some ideas related to THz emission in Spintronics devices along with first principle calculations made on Gr based heterostructures.

- [1] H. Park et al., , Topological Surface-Dominated Spintronic THz Emission in Topologically Nontrivial $\text{Bi}_{1-x}\text{Sb}_x$ Films. *Adv. Sci.* 2022, 9, 2200948
- [2] E. Rongione et al., Spin-Momentum Locking and Ultrafast Spin-Charge Conversion in Ultrathin Epitaxial $\text{Bi}_{1-x}\text{Sb}_x$ Topological Insulator. *Adv. Sci.* 2023, 10, 2301124.
- [3] S. Rho et al., Exceptional Spin-to-Charge Conversion in Selective Band Topology of $\text{Bi}/\text{Bi}_{1-x}\text{Sb}_x$ with Spintronic Singularity. *Adv. Funct. Mater.*, 33: 2300175.
- [4] A. Pezo, J. M. George, H. Jaffres, Theory of spin and orbital charge conversion at the surface states of $\text{Bi}_{1-x}\text{Sb}_x$ topological insulator.

Séminaire organisé dans le cadre du programme interdisciplinaire MAT-PULSE



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