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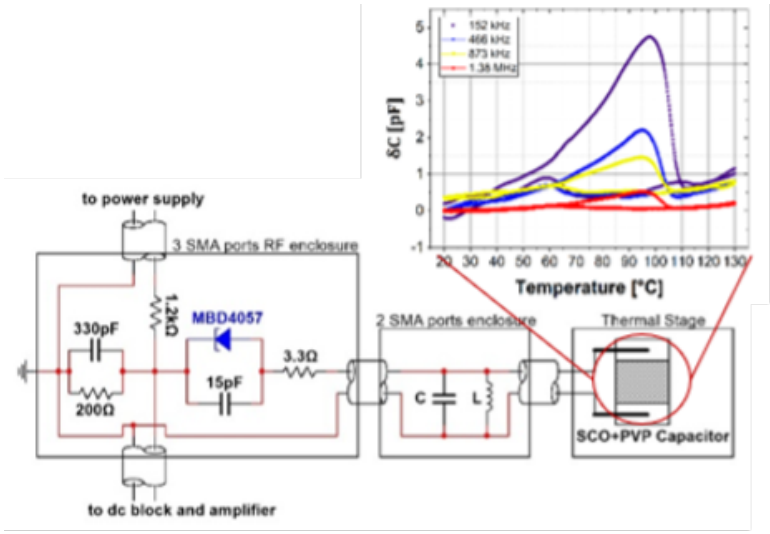
THURSDAY
**12**
FEBRUARY





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## Charge transport properties of bistable molecular complexes and their integration into nanoelectronic and spintronic devices

1:30pm - 2:30pm (Salle des thèses GR L 0130 - Grandmont - Tours)


Multi-Spin crossover (SCO) complexes are a prominent class of molecular materials exhibiting reversible transitions between low-spin and high-spin electronic states under external stimuli such as temperature or electric fields. These transitions are accompanied by significant changes in molecular volume, electronic structure, and transport-related properties, making SCO systems attractive for nanoscale sensing, memory, and adaptive electronic devices [1]. A key challenge in this field is the reliable electrical detection and integration of molecular spin-state switching into solid-state electronic architectures [2]. In this seminar, I will present recent advances in the electrical sensing and device-level integration of SCO materials, focusing on broad band dielectric spectroscopy [3], tunnel diode oscillator (TDO) technique [4] and organic field-effect transistor (OFET)–based platforms [5,6]. We discuss how thin films and composites incorporating SCO complexes can be coupled to organic semiconducting channels, enabling the transduction of molecular spin-state transitions into pronounced electrical responses. In particular, spin crossover–induced mechanical strain and interfacial effects are shown to modulate charge transport in the transistor channel, leading to reproducible and reversible current variations. The presented results demonstrate that SCO-related spin-state switching can be efficiently detected using standard electronic readout schemes, without requiring direct charge transport through the molecular layer. This indirect sensing approach enhances device robustness and compatibility with existing organic electronic technologies. These findings establish SCO–OFET hybrid systems as a versatile platform for exploring spin-dependent phenomena at the nanoscale and open new perspectives for multifunctional electronic devices combining molecular bistability with scalable semiconductor technologies.



**References** [1] E. Coronado, Nature Reviews Materials, 5 (2020) 87-104. [2] C. Lefter, et al., Magnetochemistry, 2 (2016) 18. [3] A. Diaconu, et al., J. Phys. Chem. Lett., 8 (2017) 3147-3151. [4] I. Soroceanu, et al., J. Compos. Sci. 2025, 9, 49 [5] Y. Zhang, et al, RSC Advances, 15 (2025) 8757-8763. [6] Y. Zhang, et al., Adv. Elect. Mater., 11 (2025) 2400590.


🗓️ Upcoming GREMAN Seminars:

- ✦Tuesday, March 10, 2026 (11AM): *Barbara MALIC - Seminar* (SDM site)
- ✦Thursday,March 26, 2026 (1:30PM): *Julien VASSEUR - Journal Club* (MTC site)
- ✦Thursday, April 9, 2026 (1:30PM): Thierry *LAHAYE - Seminar* (EMA site)