MOLECULAR MAGNETISM – A KEY ISSUE FOR QUANTUM TECHNOLOGY

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A major interest in physics, chemistry and materials science is the interface between solid-state physics and functional molecular systems. The bottom-up synthetic approach takes advantage of the intrinsic physical properties of a molecule, of which billions atomically precise copies can be synthesized by chemical methods. Moreover, molecular systems can be organized by surface-confinement and self-assembly protocols using their respective components (organic molecules, metal ions, complexes, etc.) towards complex systems at the organizational level. Beyond this, the molecules often exhibit a wide range of electronic, magnetic, and spintronic properties of fundamental interest and practical importance, thus opening bright avenue towards novel functional nanosystems.

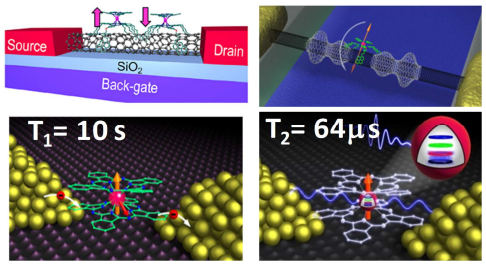

Fig. SMM-based Spintronics Devices

In this talk I will present results from the close collaboration of groups from synthetic chemistry [1, 2] and experimental physics exploring magnetic molecules as building bricks for spintronic devices [3-5]. In this context, the investigation of quantum properties of a single nuclear-spin is a demanding goal. The molecular spin-transistor fabricated allowed for an electrical, non-destructive read-out of the nuclear spin state. Exploiting this property we were able to measure the real-time quantum trajectory of an isolated nuclear spin qubit [6, 7].

Keywords: SMM; Spintronic; Device

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