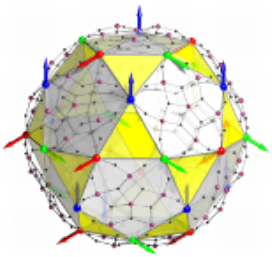

Contribution ID: **10** Type: **Keynote**

Operating quantum states in single magnetic molecules

Friday, 7 June 2019 09:00 (1 hour)

The endeavour of quantum electronics is driven by one of the most ambitious technological goals of today' s scientists: the realization of an operational quantum computer. We start to address this goal by the new research field of molecular quantum spintronics, which combines the concepts of spintronics, molecular electronics and quantum computing. The building blocks are magnetic molecules, i.e. well-defined spin qubits. Various research groups are currently developing low-temperature scanning tunnelling microscopes to manipulate spins in single molecules, while others are working on molecular devices (such as molecular spin-transistors) to read and manipulate the spin state and perform basic quantum operations. We will present our recent measurements of geometric phases, the iSWAP quantum gate, the coherence time of a multi-state superposition, and the application to Grover's algorithm [1-5].
[1] S. Thiele, F. Balestro, R. Ballou, S. Klyatskaya, M. Ruben, W. Wernsdorfer, Science, 2014, 344, 1135.
[2] M. Ganzhorn, S. Klyatskaya, M. Ruben, W. Wernsdorfer, Nature Nanotechnol., 2013, 8, 165; Nature Comm., 2016, 7, 11443.
[3] M. N. Leuenberger, D. Loss, Quantum computing in molecular magnets. Nature 410, 789-793(2001).
[4] C. Godfrin, A. Ferhat, R. Ballou, S. Klyatskaya, M. Ruben, W. Wernsdorfer, F. Balestro, Phys. Rev. Lett. 119, 187702 (2017).
[5] C. Godfrin, et al.,. npj Quant. inf. 4, 53 (2018).

Primary author: WERNSDORFER, Wolfgang

Presenter: WERNSDORFER, Wolfgang

Session Classification: Molecular magnetism

Track Classification: Molecular magnetism