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### Coherence dynamic in large spins qubits

Coherence of electron spins attract a great interest for the last decades due to their potential application as qubits (fundamental part of the quantum computer). The majority of candidates are isotropic two level systems ( $S=1/2$ ) where the dynamics is perfectly known and predictable. In this seminar I will present some results on the quantum dynamics probed by electron spin resonance of large spin qubits where the number of levels is larger than two and the anisotropy plays an important role. I will present the quantum dynamics of rare earth qubits where the large anisotropy couple the static magnetic field, the hyperfin interaction and microwave field [1,2]. Then I will present the case of  $Mn^{2+}$  in a cubic crystal where the anisotropy is very small and where the coherent dynamic of electron spin is non linear with multiple photon transition [3]. To finish I will show the first observation of Rabi oscillations in defect correlated to a quantum spin chain (pinned soliton) [4]. [1] S. Bertaina, J. H. Shim, S. Gambarelli, B. Z. Malkin, and B. Barbara, Phys. Rev. Lett. 103, 226402 (2009). [2] S. Bertaina, S. Gambarelli, A. Tkachuk, I. N. Kurkin, B. Z. Malkin, A. Stepanov, and B. Barbara, Nat. Nanotechnol. 2, 39 (2007). [3] S. Bertaina, L. Chen, N. Groll, J. Van Tol, N. S. Dalal, and I. Chiorescu, Phys. Rev. Lett. 102, 50501 (2009). [4] S. Bertaina, C.-E. Dutoit, J. Van Tol, M. Dressel, B. Barbara, and A. Stepanov, Phys. Rev. B 90, 060404 (2014).

5. Mai 2015, 13:00 Uhr

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