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Non linear quantum decoherence behavior in the molecular magnet V15 SYLVAIN BERTAINA, CNRS - IM2NP, J. SHIM, S. GAMBARELLI, LCIB - CEA, T. MITRA, Bielefeld University, B. TSUKERBLAT, Ben Gurion University, A. MULLER, Bielefeld University, E. BAIBEKOV, B. MALKIN, Kazan Federal University, B. BARBARA, Neel Institut — Molecular magnets attract a great interest for many years since their potential application in quantum information processing. Quantum coherence, the property needed to create a qubit (fundamental piece of a quantum computer) has shown recently in V15 [1]. Since, the studies of decoherence behavior in molecular magnets have been extremely active. In the present talk, we will present a non linear microwave power dependence of the decoherence in V15 [2]. Generally, the decoherence probed but electron spin resonance increase linearly when the microwave field increase. Here we will show how the nuclear spin bath could dramatically change this dynamic. When the Rabi frequency is close to the nuclear Zeeman frequency coherence form the electron spin in transferred to the nuclear spin and is dissipated reducing the macroscopic electron spin coherence.

[1] Bertaina, S., Gambarelli, S., Mitra, T., Tsukerblat, B., Müller, A., & Barbara, B. (2008). Quantum oscillations in a molecular magnet. Nature, 453(7192), 203–6.
[2] Shim, J., Bertaina, S., Gambarelli, S., Mitra, T., Müller, a., Baibekov, E., Malkin, B., et al. (2012). Decoherence Window and Electron-Nuclear Cross Relaxation in the Molecular Magnet V15. Physical Review Letters, 109(5), 1–5.

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