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NMR of small frustrated electron spin systems: example of V15 molecular magnet VIATCHESLAV DOBROVITSKI, QuTech, Delft University of Technology, P.O. Box 5046, 2600 GA Delft — Frustrated spin systems with multiply degenerate ground state exhibit interesting properties, including formation of the macroscopic spin liquid state [1]. The nuclear magnetic resonance (NMR) is particularly valuable for studying frustration: it allows local probe of the electron spin systems and provides important information about the frustrated many-spin states [2,3]. However, the standard theory of NMR is not directly applicable to the frustrated system, because it assumes large separation between the spin states of the electronic subsystem (fast electron spin dynamics). We investigate how the NMR spectra are formed in the presence of frustration, taking as an example the V15 magnetic molecule, whose low-energy properties are defined by three frustrated electron spins with a doubly degenerate ground state. Considering the coupled electron-nuclear system, we show that the electron and the nuclear spins form a set of joint entangled states that define the NMR spectrum. We revise the earlier NMR experiments on V15 [3], and provide an alternative view of the experimental results. [1] L. Balents, Nature 464, 199 (2010) [2] M. Fu et al, Science 350, 655 (2015) [3] Y. Furukawa et al, Phys. Rev. B 75, 220402(R)(2007)

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