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Single Crystal NMR Study of Frustrated Spin-Liquid in S = 1/2 Kagome Lattice $ZnCu_3(OD)_6Cl_2$ MINGXUAN FU, DAVID. A. TORCHETTI, Department of Physics and Astronomy, Mcmaster University, Hamilton, ON L8S 4M1, CAN, TAKASHI IMAI, Department of Physics and Astronomy, Mcmaster University, Hamilton, ON L8S 4M1, CAN; Canadian Institute for Advanced Research, Toronto M5G 1Z8, CAN, TIANHENG HAN, YOUNG. S. LEE, Department of Physics, MIT, Cambridge, Massachusetts 02139, USA — Herbertsmithite $ZnCu_3(OD)_6Cl_2$ is one of the most promising examples for a quantum spin liquid state. Despite the remarkable absence of long range magnetic order down to at least 50mK, understanding the magnetic properties of $ZnCu_3(OD)_6Cl_2$ remains a challenge. This is mainly due to the difficulty in locating the defects, and in understanding the possible role of defects in the physical properties of this material. We have investigated the local magnetic and lattice environment of $ZnCu_3(OD)_6Cl_2$ single crystals[1] using NMR techniques[2]. With successful identification of ^2D NMR signals arising from the nearest neighbors of Cu^{2+} defects substituting Zn, we find that 14(2)% of Zn sites are occupied by these weakly interacting Cu^{2+} defect spins, which contribute to the large Curie-Weiss enhancement of bulk susceptibility at low temperatures. We then discuss the key aspects of nuclear spin-lattice relaxation rate $1/T_1$ measured near the defect and intrinsic sites.

[1]T. H. Han *et al.*, Phys. Rev. B **83**, 100402(R) (2011)
[2]T. Imai *et al.*, Phys. Rev. B **84**, 020411(R) (2011); see also Phys. Rev. Lett. **100**, 077203 (2008)

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