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^{17}O Single Crystal NMR Study on S = 1/2 Kagome Lattice $ZnCu_3(OH)_6Cl_2$ MINGXUAN FU, TAKASHI IMAI, Department of Physics and Astronomy, McMaster University, Hamilton, ON, Canada, TIANHENG HAN[1], YOUNG. S. LEE, Department of Physics, MIT, Cambridge, MA, USA — Herbersmithite $ZnCu_3(OH)_6Cl_2$ is known to be a promising candidate material hosting a quantum spin liquid ground state. The recent success in single crystal growth of $ZnCu_3(OH)_6Cl_2$ as well as the discovery of a continuum of spinon excitations using inelastic neutron scattering[2] have opened a new chapter in the study of highly frustrated magnetism. However, the mechanism behind the realization of the non-magnetic ground state in $ZnCu_3(OH)_6Cl_2$ remains controversial, mainly due to the difficulty in understanding the role of defects in its physical properties. Through single-crystal ^{17}O NMR study, we identified multiple O sites with distinct local magnetic environments. The behavior of local spin susceptibility and spin dynamics observed at these O sites provide invaluable insights into the nature of defects and their potential influence on the kagome spin lattice.[3]

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[2]T. H. Han *et al.*, Nature **492**, 406(2012)
[3]M. Fu, T. Imai *et al.*, in preparation. Also see T. Imai. *et al.*, Phys. Rev. B **84**, 020411(R) (2011); Phys. Rev. Lett. **100**, 077203 (2008)

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