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Single crystal NMR investigation of $S = 1/2$ kagome Heisenberg antiferromagnet

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Herbertsmithite $\text{ZnCu}_3(\text{OH})_6\text{Cl}_2$ is a mineral material that hosts a kagome plane consisting of Cu^{2+} ions with spin $S = 1/2$. We will discuss our single crystal NMR measurements to probe the local spin susceptibility (based on the NMR frequency shift), low frequency spin fluctuations (based on the spin-lattice relaxation rate $1/T_1$), and the effects of defect Cu^{2+} spins occupying the Zn^{2+} sites. We will show that both the local spin susceptibility and spin fluctuations in low magnetic fields show a signature of a small energy gap in the excitation spectrum [1,2].

Ref.

[1] M. Fu et al., Science 350 (2015) 655 and references therein.

[2] N. E. Sherman et al., Phys. Rev. B 94 (2016) 140415R.

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