Low-temperature spin dynamics in the kagomé system $Pr_3Ga_5SiO_{14}$

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- The nature of the ground state of geometrically frustrated antiferromagnetic spin systems is currently a subject of great interest.
- Attention has recently focused on low *T* dynamical spin liquid states that may exist in 2-D triangular lattices - specifically the corner shared kagomé lattice.
- The present work is concerned with a recently discovered rare earth kagomé, $Pr_3Ga_5SiO_{14}$ (PGS).

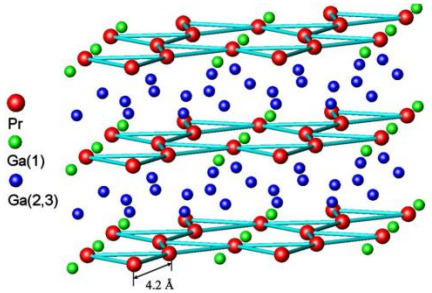

Fig. 1 Crystal structure of PGS, showing three kagomé planes.

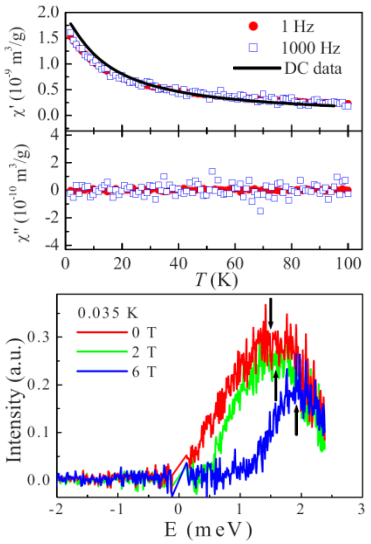

Fig. 2 (a) Susceptibility vs. *T*, and **(b)** neutron scattering as a function of energy.

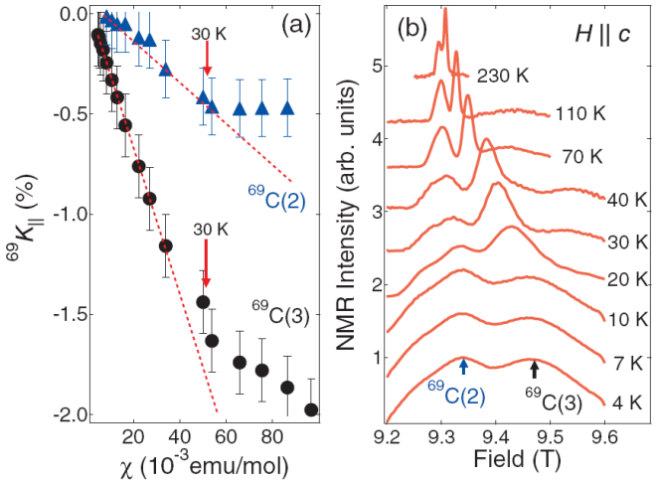

Fig. 3 (a) ^{69}Ga NMR shifts vs. χ in applied field of 9 T ($H||c$), and **(b)** field-swept NMR spectra at 95 MHz as a function of *T*.

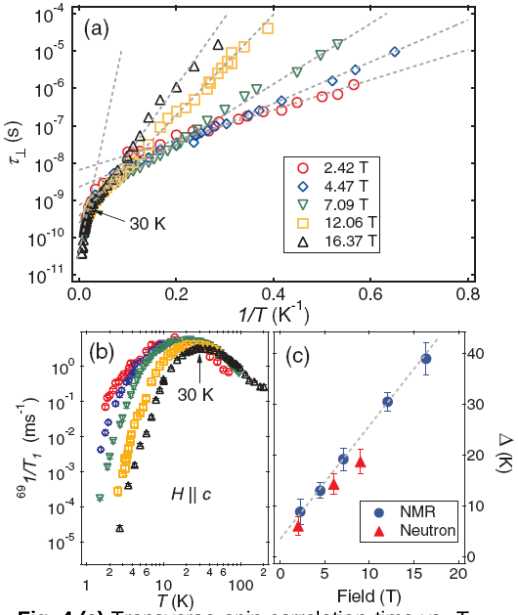

Fig. 4 (a) Transverse spin correlation time vs. *T*, **(b)** ^{69}Ga relaxation rate vs. *T*, and **(c)** field dependent gap from NMR and neutron scattering.

- Zero-field and in-field neutron scattering, susceptibility and specific heat measurements show no long range ordering in PGS well below 1 K.

- Neutron scattering (fig. 2) and NMR (figs. 3 and 4) results provide evidence for field-induced short-range ordering for T<10 K.

- Both neutron scattering and NMR reveal a field-dependent energy gap in the low energy excitation spectrum (Fig. 4c). The findings are consistent with a dynamical spin state at low temperatures and provide evidence for a spin liquid phase.

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