

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

^{27}Al -NMR Study of the Spinel Compound CoAl_2O_4 ¹ BEAS ROY, ABHISHEK PANDEY, DAVID C. JOHNSTON, YUJI FURUKAWA, Ames Laboratory & Dept. Phys. Astro., Iowa State Univ., Ames IA — CoAl_2O_4 , a geometrically frustrated magnet, is believed to be located in the vicinity of a quantum melting point of the AFM ordered state. In CoAl_2O_4 , magnetic frustration originates from Co^{2+} ($S = 3/2$) spins on the tetrahedral A-site via non-magnetic Al ions occupying the octahedral B-site. To study the magnetic properties of CoAl_2O_4 from a microscopic point of view, we have carried out ^{27}Al -NMR measurements using a well-characterized powder sample of CoAl_2O_4 . The temperature dependence of the magnetic susceptibility χ shows a broad peak around 15 K and does not show any difference in zero-field-cooled and field-cooled measurements. ^{27}Al -NMR spectra at 9.3 MHz ($H = 0.84$ T) show seven peaks characterized by quadrupolar splitting with $\nu_Q = 0.55$ MHz at temperatures above 10 K. Below 10 K, the spectrum broadens suddenly. We also observe a peak of $1/T_1$ of ^{27}Al at 10 K. These NMR results clearly indicate magnetic ordering at 10 K, although χ does not exhibit any signature of long-range magnetic ordering.

¹Supported by the USDOE under Contract No. DE-AC02-07CH11358.

Beas Roy
Ames Laboratory & Dept. Phys. Astro., Iowa State Univ., Ames IA

Date submitted: 14 Nov 2012

Electronic form version 1.4