Abstract Submitted
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Complex 2D Oxide $BaCuSi_2O_6$: A NMR Study[1] R. STERN, NICPB, 12618 Tallinn, Estonia, S. KRÄMER, M. HORVATIC, C. BERTHIER, GHMFL, CNRS, 38042 Grenoble, France, I. HEINMAA, E. JOON, NICPB, 12618 Tallinn, Estonia, T. KIMURA, LANL, Los Alamos, NM 87545, USA, S.E. SEBASTIAN, I.R. FISHER, Geballe Lab and Dept of Appl. Phys, Stanford University, Stanford, CA 94305, USA — $BaCuSi_2O_6$ is a quasi-2D oxide composed of $Cu_2Si_4O_{12}$ layers where Cu^{2+} ions are arranged in well-separated dimers perpendicular to 2D layers. It has a singlet ground state in zero magnetic field, with a large gap to the lowest excited triplet states. Magnetic fields in excess of $H_{c1} \sim 23.5$ T close the gap, cooling in $H \leq H_{c1}$ results in a state characterized by long-range magnetic order, the nature of which has not been determined yet. We present nuclear magnetic resonance (NMR) measurements of ^{29}Si and ^{63,65}Cu on single crystals of $BaCuSi_2O_6$ below as well as above H_{c1}. Our results prove that the system is less symmetric and more complicated than initially supposed. In the "normal" phase we confirmed an IC character of the phase below 100 K. Unexpectedly, two copper sites having strongly different spin polarizations have been observed, which can be associated by the presence of two different gaps and J (J_1 and J_2) values in the system. Analysis of these data provides a quantitative measure for the size of the perturbation of the "ideal" Hamiltonian, helping to decide whether a BEC-type description is still possible.

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