Session 26bE

Dynamic Spin Freezing in the Spin Ice Compound $Dy_2Ti_2O_7$ **26bE1**

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Recent work has shown that the geometrical frustration of ice is replicated by $Dy_2Ti_2O_7$, a site-ordered magnetic material in which the spins reside on a lattice of corner sharing tetrahedra and form a novel magnetic ground state known as "spin ice" We have found a cooperative spin-freezing transition leading to the spin ice ground state in $Dy_2Ti_2O_7$ which dilution studies show is associated with the development of spin-spin correlations. This transition is associated with a very narrow range of relaxation times which is more analogous to the freezing of protons in ice than spin-freezing in traditional spin glasses.

Magnetic Ordering under High Pressure in the Quantum Spin System $TlCuCl_3$ **26bE2**

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$TlCuCl_3$ is a strongly coupled spin dimer system with the excitation gap $\Delta/k_{\rm B} = 7.7$ K. It was found that at pressure of $P = 10$ kbar, $TlCuCl_3$ undergoes magnetic ordering at $T_{\rm N} \approx 10$ K. The phase diagram for the magnetic field parallel to the $[2, 0, 1]$ direction is presented.

26bE3 Microscopic Magnetic Phase Separation at the Impurity Stimulated Antiferromagnetic Ordering of two Spin-Gap Systems

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ESR spectra of spin-Peierls compound $CuGeO_3$ and Haldane magnet $PbNi_2V_2O_8$, both doped with 1-2% Mg, revealed the coexistence of paramagnetic (PM) and antiferromagnetic (AFM) resonance modes below the Néel point. The ordering is known to be due to the restoring of the AFM staggered magnetization near impurities. The surprising PM spectral component indicates a nonuniform phase: clusters of staggered magnetization, touching each other, form AFM areas, though some clusters are isolated from AFM areas by the residual of the spin-gap matrix. Isolated clusters provide PM signals due to their net spin.

26bE4 Coexistence of Gap-less and Gapped Excitations in NH_4CuCl_3

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ESR investigations are performed on a low dimensional compound NH_4CuCl_3 with magnetization plateaux. In the phase below the $\frac{1}{4}$–plateau, a coexistence of two-types of triplets and a gap-less mode is found. Below 1.3 K at which spins of the gap-less mode show some magnetic ordering, the higher energy triplet mode exhibit no changes. In addition to the previously reported gapped modes at $\frac{1}{4}$– and $\frac{3}{4}$–plateaux, a new low energy mode is found at the half of the saturation field. This mode may be related to an "irrelevant instability" of $\frac{1}{2}$–plateau that has not been found in the previous static magnetization measurement.

26bE5 Low temperature NMR studies of $Na_2V_3O_7$

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We have performed ^{23}Na-NMR measurements on the quasi one-dimensional spin 1/2 system $Na_2V_3O_7$ at low temperatures. The temperature dependence of the spin lattice relaxation rate $T_1^{-1}(T)$ measured at 78 MHz exhibits a narrow peak near 2.5 K, indicating the onset of a cooperative phase transition to a state with a small gap in the spectrum of V spin excitations. Considering the results of the susceptibility at higher temperatures, it seems likely that this transition reflects the onset of antiferromagnetic order. The observed increase of the critical temperature, upon enhancing the applied magnetic field, however, indicates that the nature of the transition must be investigated in more detail.

Single-component Ferrimagnetism by an Organic Triradical and Variable Spin-network Composed of Organic Polyradicals

26bE6

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Focusing on the quantum nature of organic radicals which consist only of light elements, we have constructed several spin networks. Intramolecular magnetic exchange couplings are controllable by the design of the molecular structure. An organic biradical BNO [BNO=1,3-bis(N-$tert$-butylaminoxyl)benzene] can be regarded as an $S = 1$ species, since BNO consists of $S = 1/2$ spin pairs (dimers) in which the two spins are coupled ferromagnetically with $2J/k_{\rm B} \geq 600$ K. Combination of the BNO unit and another $S = 1/2$ species by the intra- and intermolecular antiferromagnetic interactions results in the ferrimagnetic network. Properties of the ferrimagnetic PNNBNO molecule and related materials are presented.