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Possible spin liquid behavior in $Sc_2Ga_2CuO_7$ A.V. MAHAJAN, R. KUMAR, IIT Bombay, India, P. KHUNTIA, Ames Lab, Iowa State Univ, USA, D. SHEPTYAKOV, PSI, Switzerland, P.G. FREEMAN, H.M. RONNOW, EPFL, Switzerland, B KOTESWARARAO, IIT Bombay, India, M. BAENITZ, MPICPFS, Germany, Y. FURUKAWA, Ames Lab, Iowa State Univ, USA, M. JEONG, EPFL, Switzerland — The title compound crystallizes in a hexagonal structure (space group P63/mmc) containing edge-shared triangular planes as also triangular bi-planes. Our work establishes that the single triangular layers mainly have $S = 0$ Ga^{3+}(85% Ga, 15% Cu), while the bi-layers contain 43% Cu^{2+} and 57% Ga^{3+}, as far as the cations are concerned. Our $\chi(T)$ data shows no spin-freezing or magnetic long-range order (LRO) down to 1.8 K. We infer an effective moment of 1.79 μ_B and a θ_{CW} of about -50 K, suggesting AF interactions. In our specific heat data, no anomalies were found down to 0.35 K, in the field range 0-140 kOe. The magnetic specific heat has a nearly T^2 power-law behavior at low-T (for $H > 90$ kOe). The ^{71}Ga nuclear magnetic resonance (NMR) shift $K(T)$ displays a broad maximum at $T \sim 50$ K. The ^{71}Ga spin lattice relaxation rate $1/T_1$ displays a $T^{3.2}$ power-law increase from 0.1 K to 2 K, then remains nearly unchanged up to 10 K, and increases thereafter. Once again, down to 100 mK there is no indication of LRO which is usually manifested as an anomaly in the T-dependence of K and $1/T_1$. Our data suggest the formation of a quantum spin liquid in the $S = 1/2$ system $Sc_2Ga_2CuO_7$.

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