New potential quantum spin liquid systems: $Sr_3CuM_2O_9$ [M= Sb, Nb] and Y_2CuTiO_6

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Motivated by the recent findings in the $Ba_3CuSb_2O_9$ system, we have investigated $Sr_3CuM_2O_9$ [M= Sb, Nb] for possible spin liquid behaviour. Due to the different ionic size of Sr compared to Ba, the Sr-based systems crystallize in a different structure that the Basystem. The bulk susceptibility of the Sr-based compounds shows a Curie-Weiss behaviour with a large, AF θ_{CW} but no sign of ordering down to 1.8 K. Our specific heat data show no anomalies down to 0.3 K and a power law behaviour of the magnetic heat capacity is seen. ¹²¹Sb and ⁹³Nb NMR data also do not show any evidence of LRO. These data point towards quantum spin liquid (QSL) behaviour.

The system Y_2CuTiO_6 contains edge-shared triangular planes where the vertices are occupied by magnetic Cu and nonmagnetic Ti atoms in equal proportion. In spite of the large dilution of the triangular magnetic lattice, the magnetic susceptibility shows a large, AF θ_{CW} without any sign of ordering down to 1.8 K. Likewise, the heat capacity shows no anomalies and the magnetic contribution has a power law behaviour at low-temperatures. Our ⁸⁹Y NMR results also do not show any signs ordering, once again suggesting QSL behaviour.

I will present the results of our bulk and local probe (NMR) measurements on the above systems.