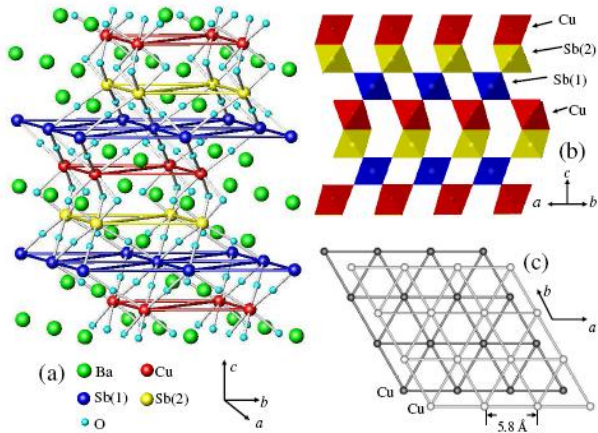


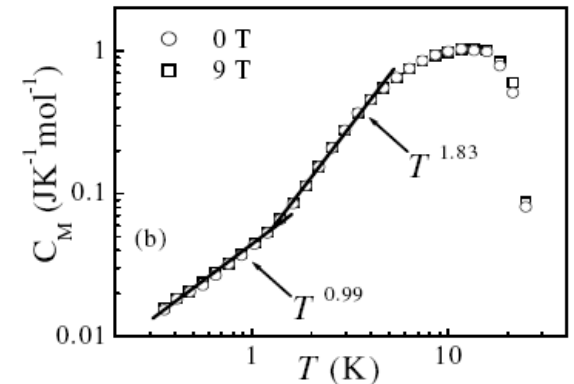
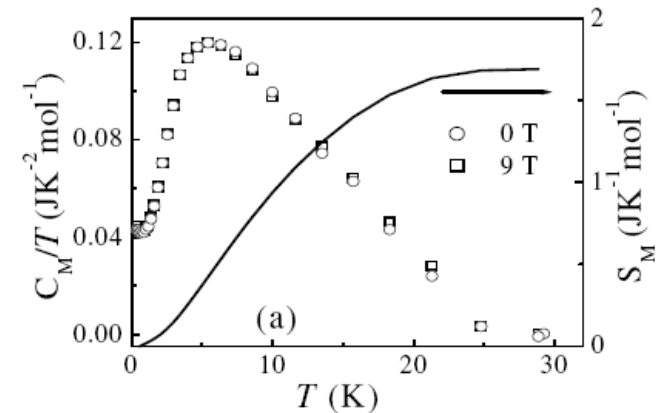


# Spin liquid state in the $S = 1/2$ triangular lattice $\text{Ba}_3\text{CuSb}_2\text{O}_9$

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(a) Schematic crystal structure for  $\text{Ba}_3\text{CuSb}_2\text{O}_9$ ; (b) The layer structure along the  $c$ -axis; (c) The triangular lattice of  $\text{Cu}^{2+}$  in the  $ab$  plane.



(a) The temperature dependencies of  $C_M/T$  and the magnetic entropy variation  $S_M$ ; (b) The temperature dependence of  $C_M$  (open symbols). The solid lines are fits as  $C_M \propto T^\alpha$ .

One of the current thrusts of modern condensed matter science has been the realization of an important model compound known as the quantum spin liquid (QSL). We unveil a new candidate for a spin liquid compound:  $\text{Ba}_3\text{CuSb}_2\text{O}_9$  in which  $\text{Cu}^{2+}$  species form a geometrically frustrated triangular lattice. The magnetic susceptibility and neutron scattering experiments on this material show no magnetic ordering down to 0.2 K despite moderately strong anti-ferromagnetic interactions with  $J \sim 32$  K. The magnetic specific heat reveals a  $T$ -linear dependence with  $\gamma = 43.4$  mJ/molK<sup>2</sup> below 1.4 K, suggesting that a Fermi surface forms at finite temperatures in this inorganic insulator.

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