Ground states in Cu2Te2O5X2 and Cu3ZO6 systems with coupled spin clusters

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Quantum effects are enhanced by reduced dimensionality and frustrating interactions, making connected spin clusters ideal model systems. Frustration can be based on triangular units (triangular and kagom lattices) in two dimensions (2D) and tetrahedral clusters (FCC and pyrochlore lattices) in 3D. We are currently investigating the Cu2Te2O5X2 (X=Cl, Br) system with tetrahedral spin clusters and the Cu3ZO6 (Z=Te,W) system with hexagonal clusters. Controlled by the level of frustration either singlet, spin liquid or magnetically ordered ground states occur. Information on ground states is obtained by diffraction methods (powder/single-crystal, x-ray synchrotron, non-polarized and polarized neutrons), excited states are studied by inelastic neutron scattering.