

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Evidence of valence bond condensation in the frustrated cluster magnet $\text{LiZn}_2\text{Mo}_3\text{O}_8$ JOHN SHECKELTON, JAMES NEILSON, DANIEL SOLTAN, TYREL MCQUEEN, Johns Hopkins University — The reduced molybdenum oxide $\text{LiZn}_2\text{Mo}_3\text{O}_8$ is a Mott insulating material built of two dimensional layers of magnetic Mo_3O_{13} triangular clusters, arranged on a triangular lattice. Between these magnetic layers are disordered non-magnetic LiZn_2 layers. The formal oxidation state and calculations show each molybdenum cluster collectively produces a $S=1/2$ moment. The “triangle of triangles” arrangement of magnetic clusters gives rise to exciting frustrated magnetic physics while also preventing Jahn-teller instabilities and site disorder seen in single ion frustrated systems. In addition, the structure allows for facile electronic doping of the magnetic layers. Structural and measured physical properties and ongoing research will be discussed. The evidence discussed indicates the formation of an exotic condensed valence bond state, reminiscent of the long-sought resonating valence bond state.

John Sheckelton
Johns Hopkins University

Date submitted: 29 Oct 2012

Electronic form version 1.4