

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Additional evidence for complex 2-site polarons in CMR manganites.** FRANK BRIDGES, GEZA KURCZVEIL, LISA DOWNWARD, UC Santa Cruz, JOHN J. NEUMEIER, Montana State University — Recently we have proposed a complex 2-site polaron model (which we call a dimeron) that exists for temperatures near and above the ferromagnetic transition temperature,  $T_c$  [1]. The dimeron has a hole delocalized over two Mn sites (i.e. a hole and an electron share the two Mn sites) and the two Mn sites have a reduced distortion compared to the remaining Jahn-Teller distorted electron sites. Magnetic clusters just above  $T_c$  are likely clusters of these dimeron quasiparticles. The average valance of the two Mn sites in the dimeron is 3.5 and the spin is  $7/2$ . We show that the Mn K-absorption edge is much better described as a sum of a 3.5 valance edge (fraction  $2x$ ) plus a 3 valance edge (fraction  $1-2x$ ), compared to earlier simulations using  $x$   $\text{CaMnO}_3$  plus  $1-x$   $\text{LaMnO}_3$ . We also show that fitting the Mn-O peak to a sum of two experimental Mn-O standards leads to a similar result as in the earlier study - a fraction  $2x$  of lower distorted Mn sites (dimerons) and a fraction  $1-2x$  of more distorted sites with  $1 e_g$  electron. Both support the proposed complex - 2-site polaron model. Supported under NSF grant DMR0301971.

[1] L. Downward et. al., Phys Rev Lett 95, 106401 (2005).

Frank Bridges  
UC Santa Cruz

Date submitted: 15 Dec 2006

Electronic form version 1.4