

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Collective Modes in the Loop Ordered Phase of Cuprates** YAN HE, UC Riverside — We show that the two branches of collective modes discovered recently in under-doped Cuprates with huge spectral weight are a necessary consequence of the loop-current state. Such a state has been shown in earlier experiments to be consistent with the symmetry of the order parameter competing with superconductivity in four families of Cuprates. We also predict a third branch of excitations and suggest techniques to discover it. Using parameters to fit the observed modes, we show that the direction of the effective moments in the ground state lies in a cone at an angle to the c-axis as observed in experiments.

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Date submitted: 15 Nov 2010

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