

Abstract Submitted
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Incompatibility of Checkerboard Patterns with the Resonance Peak in Cuprate Superconductors¹ ERICA CARLSON, DAOXIN YAO, Purdue University — Checkerboard patterns have been proposed to explain STM experiments on the cuprates BSCCO and Na-CCOC. However, simple checkerboard patterns are inconsistent with neutron scattering data, since they have low energy incommensurate spin peaks rotated 45° from the direction of the charge peaks.[1] Recently, more complicated checkerboard patterns have been proposed in order to reconcile this conflict. In this work, we have studied modulated checkerboards by using spin wave theory and analyzed noncollinear checkerboards as well. We find that the high energy response of the modulated checkerboards is inconsistent with neutron scattering results, since they fail to exhibit a resonance peak at (π, π) , which has recently been shown to be a universal feature of cuprate superconductors. Furthermore, noncollinear checkerboards also lack a resonance peak. [2] However, stripe patterns naturally exhibit a resonance peak consistent with neutron scattering data. References: [1] D. X. Yao, E. W. Carlson and D. K. Campbell, Phys. Rev. B 73, 224525 (2006) [2] D. X. Yao and E. W. Carlson, arXiv:0708.1966

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