

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Commensurable, incommensurable, or discommensurable spin arrangements in high- T_c superconductors ERICH P. STOLL, PETER F. MEIER, Physics Institute, University Zurich, CH-8057 Zurich, Switzerland — In the undoped parent compounds of high- T_c superconductors the spins on neighboring copper atoms are antiferromagnetically ordered. Neutron diffraction measurements on the $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ system show at low temperatures four peaks in the spin-fluctuation spectrum in the neighborhood of the antiferromagnetic $(\pi/a, \pi/b)$ point. The positions of these four peaks depend on the level of Sr doping. This implies that in the direct lattice the antiferromagnetic ordering exhibits incommensuration or discommensuration with fluctuations. In both cases the nearest neighbor correlation is the same on longer time scales where NMR experiments are performed, but the further distant correlations are different. We show with computer simulations how the far-field correlations break down and the AFM order parameter vanishes upon introducing disorder by dopant atoms. We simulate both in- and discommensurable spin arrangements and compare the results with NMR data.

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Date submitted: 15 Dec 2004

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