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Nonuniform spin-Peierls distortion in the "pyrochlore" antiferromagnet $ZnCr_2O_4$ GIA-WEI CHERN, OLEG TCHERNYSHYOV, Johns Hopkins University — The cubic spinel $ZnCr_2O_4$ is a nice realization of the Heisenberg antiferromagnet on the "pyrochlore lattice" with spins $S = 3/2$. A high degree of geometrical frustration creates a strongly correlated paramagnetic regime at low temperatures where spins remain liquid and move in a highly coordinated fashion. The frustration is eventually lifted through a spin-Peierls-like transition at 12.5 K [1]. A basic physical picture of the transition has been developed by Yamashita and Ueda [2] and Tchernyshyov, Moessner and Sondhi [3] for the cases of a uniform lattice distortion. However, accumulating experimental evidence points to the dominance of a nonuniform lattice distortion that enlarges the structural unit cell [4]. The lattice modes most likely involved in the transition are the four phonon doublets with the wavevectors $\langle \frac{1}{2}\frac{1}{2}\frac{1}{2} \rangle$. We discuss the symmetry aspects of the appropriate spin-Peierls order parameter and ways of measuring it. [1] S.-H. Lee *et al.*, Phys. Rev. Lett. **84,** 3718 (2000). [2] Y. Yamashita and K. Ueda, Phys. Rev. Lett. **85,** 4960 (2000). [3] O. Tchernyshyov, R. Moessner, and S. L. Sondhi, Phys. Rev. B **66,** 064403 (2002). [4] H. Ueda *et al.*, Bull. Amer. Phys. Soc. **48,** 826 (2003).

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