

Abstract Submitted
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Raman scattering studies of the pressure- and temperature-dependent phases of the orbital ordering material KCuF_3 ¹ SHI YUAN, S. LANCE COOPER, Department of Physics and Frederick Seitz Materials research laboratory, University of Illinois at Urbana-Champaign, Urbana, IL 61801 — We present a study of the temperature- and pressure-dependence of the prototypical orbital ordering system KCuF_3 using Raman scattering. Temperature-dependent measurements offer evidence for structural instabilities in KCuF_3 at temperatures well below the putative 800K orbital ordering temperature; this evidence includes the observation of anomalous softening of several phonon modes between 50K and 300K and an E_g phonon mode splitting below 50K. The latter indicates a tetragonal-to-orthorhombic structural transition near 50K just preceding the 3D magnetic ordering temperature at $T_N \approx 40\text{K}$. Low-temperature, pressure-dependent Raman studies of KCuF_3 are also reported to clarify the pressure dependence of the low temperature structural phases in this material.

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