

Abstract Submitted
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Field-Induced Orbital and Magnetic Phases in the Layered Ruthenates J. F. KARPUS, R. GUPTA, H. BARATH, S. L. COOPER, Dept. of Physics and Frederick Seitz Materials Research Laboratory, University of Illinois Urbana-Champaign, G. CAO, Dept. of Physics and Astronomy, University of Kentucky — Magnetic-field- and Temperature-dependent Raman scattering studies have been performed on $\text{Ca}_3\text{Ru}_2\text{O}_7$, which undergoes an antiferromagnetic transition at 56K and a metal-insulator transition at 48K. Although no appreciable changes in the magnon or phonon spectra are observed for fields oriented along the c-axis, a field applied in the a-b plane reveals dramatic magnetic-induced changes to both the magnon and phonon spectra. For fields aligned along the magnetic easy-axis (a-axis), a splitting in the magnon mode occurs with increasing field, as well as evidence for a metamagnetic transition above 5 T, based upon which we can deduce several magnetic parameters for this material. Furthermore, by monitoring the field-induced changes in the Ru-O phonon frequency at various temperatures, we are able to map-out various field-induced orbital and magnetic phases for fields applied along both the hard and easy axis directions. *Work supported by NSF DMR02-44502, DOE DEFG02-91ER45439, and the Sony Scholar Fund.

John Karpus
Dept. of Physics and Frederick Seitz Materials Research Laboratory,
University of Illinois Urbana-Champaign

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