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Magnetic Field Induced Phases of Ca_2RuO_4 and $Ca_3Ru_2O_7$ J. F. KARPUS, R. GUPTA, H. BARATH, S. L. COOPER, Department of Physics and Frederick Seitz Materials Research Laboratory, University of Illinois Urbana-Champaign, G. CAO, Department of Physics and Astronomy, University of Kentucky — We present a Raman scattering study of the magnetic field induced phases in the layered ruthenates Ca_2RuO_4 and $Ca_3Ru_2O_7$. Single-layer Ca_2RuO_4 has an antiferromagnetic ground state, is a paramagnetic (PM) insulator above $T_N = 113$ K and is a PM metal above $T_{MI} = 357$ K, while double-layer $Ca_3Ru_2O_7$ has an antiferromagnetic insulating ground state, is metallic above $T_{MI} = 48$ K, and is paramagnetic above $T_N = 56$ K. Applied fields oriented in the a-b planes of both these materials produce dramatic changes to both the magnetic and vibrational spectra; these changes are associated with field-induced changes in the Ru orbital populations of these materials. In this talk, we compare the field induced orbital, magnetic, and conducting phases observed in Ca_2RuO_4 and $Ca_3Ru_2O_7$. *Work supported by NSF DMR02-44502, NSF DMR02-40813, and DOE DEFG02-91ER45439.

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