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Magnetic Field Induced Phases of the Strontium Ruthenates[1]
RAJEEV GUPTA, MINJUNG KIM, HARINI BARATH, S. LANCE COOPER, Dept. of Physics and Frederick Seitz Materials Research Laboratory, University of Illinois, GANG CAO, Dept. of Physics, University of Kentucky — Magnetic-field- and temperature-dependent Raman scattering has been used to investigate the magnetic-field-induced structural and magnetic phases of the triple-layer ruthenate system $Sr_4Ru_3O_{10}$ (Sr4310), which is a low temperature ferromagnet with T_C= 105 K. Magnetic-field-induced changes in the phonon spectra reveal dramatic spin-reorientation transitions and strong magnetoelastic coupling in this material. Further, the highly anisotropic field-induced effects observed for magnetic fields along the c-axis (magnetic easy axis) and ab-plane provide insight into the complex magnetic and structural (H,T) phase diagram of this material. We compare our magnetic-field dependent Raman results in Sr4310 with those of the quantum-critical bilayer material $Sr_3Ru_2O_7$, as well as with magnetic and transport measurements of Sr4310.

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