

Abstract Submitted  
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**Terahertz circular birefringence in thin films of  $\text{Sr}_2\text{IrO}_4$** <sup>1</sup> THUC T. MAI, R. K. SMITH, E. V. JASPER, M. T. WARREN, R. VALDÉS AGUILAR, Department of Physics, The Ohio State University, S. S. A. SEO, Department of Physics Astronomy, University of Kentucky — Due to its similarity to  $\text{La}_2\text{CuO}_4$ , the parent compound for the high Tc superconductors,  $\text{Sr}_2\text{IrO}_4$  has been in the spotlight of much recent research effort.  $\text{Sr}_2\text{IrO}_4$  is one of the first examples of a spin-orbit-assisted Mott insulator. It undergoes a metal to insulator transition around 240 K, coincident with antiferromagnetic ordering that is accompanied by a weak ferromagnetic moment. Motivated by a recent nonlinear optical experiment that insinuates a magnetoelectric ground state of orbital currents in the unit cell, we investigate the circular birefringence and dichroism of THz radiation on thin films of  $\text{Sr}_2\text{IrO}_4$ . We have developed a novel technique to generate broadband circular polarized THz pulses, and use it to probe the nature of the ground state of  $\text{Sr}_2\text{IrO}_4$ . The THz measurements reveal a non-trivial behavior of the circular birefringence around the transition temperature and as a function of magnetic field. We will discuss these results in the context of the magnetic structure models in  $\text{Sr}_2\text{IrO}_4$ , and of the potential implication on its point group symmetry.

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