

Abstract Submitted  
for the MAR17 Meeting of  
The American Physical Society

**Ultrafast control of coherent phonon oscillations in the magnetic Weyl semimetal SrMnSb<sub>2</sub>**<sup>1</sup> CHRISTOPHER WEBER, MADISON MASTEN, THOMAS OGLOZA, Santa Clara University, JINYU LIU, ZHIQIANG MAO, Tulane University — SrMnSb<sub>2</sub> is believed to be a Weyl semimetal. It is centrosymmetric, and has canted antiferromagnetic order that breaks time-reversal symmetry. After exciting crystals of SrMnSb<sub>2</sub> with short pulses of near-infrared light, we observe the coherent oscillation of several phonon modes in the range of a few THz, and we measure the phonons' frequency in both zero and high magnetic field. We use an ultrafast two-pump-one-probe experiment to distinguish first-order (coherent) excitation of phonons from second-order (squeezed) excitation, and to control the amplitude of the oscillations. We use angle-dependent Raman measurements to identify the symmetry of the phonon modes, and to relate them to the crystal structure. In light of our observations, we will discuss the prospects for ultrafast control of the Weyl state in SrMnSb<sub>2</sub>.

<sup>1</sup>NSF DMR-1508278

Christopher Weber  
Santa Clara University

Date submitted: 10 Nov 2016

Electronic form version 1.4