

Abstract Submitted  
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**Nonlinear Optical Spectroscopy as a possible probe of Hidden Order in URu<sub>2</sub>Si<sub>2</sub>** DARIUS TORCHINSKY, LIUYAN ZHAO, HAO CHU, Institute for Quantum Information and Matter, California Institute of Technology, NORAVEE KANCHANAVATEE, BRIAN MAPLE, Department of Physics, University of California, San Diego, DAVID HSIEH, Institute for Quantum Information and Matter, California Institute of Technology — The symmetry of the primary order parameter underlying the hidden order (HO) phase of URu<sub>2</sub>Si<sub>2</sub> is a topic of ongoing debate. Although high-rank multipole orderings are proposed, these are challenging to resolve experimentally using diffraction based probes. We investigate the possibility of using the nonlinear optical response of URu<sub>2</sub>Si<sub>2</sub> to measure electronic multipolar ordering. We report temperature and wavelength dependent nonlinear optical harmonic generation measurements on micron scale areas of URu<sub>2</sub>Si<sub>2</sub> single crystals using a novel low temperature rotational anisotropy technique<sup>1</sup>. We identify a nonlinear optical susceptibility tensor that couples to HO whose implications on the symmetry of the HO parameter will be discussed.

<sup>1</sup>D. H. Torchinsky *et al.*, **Rev. Sci. Instrum.** 85, 083102 (2014)

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