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Terahertz nonlinear optical response from transition metal monopnictide Weyl semimetal TaAs SHREYAS PATANKAR, LIANG WU, ARIELLE LITTLE, ERIC THEWALT, DYLAN REES, NITYAN NAIR, JAMES ANALYTIS, JOSEPH ORENSTEIN, University of California, Berkeley — Weyl semimetals are a newly discovered class of materials whose low-energy excitations are massless chiral fermions known as Weyl fermions. It has recently been shown that the transition metal monopnictide (TMMP) family of Weyl semimetals has a giant anisotropic nonlinear optical response, [arXiv:1609.04894] as revealed by optical second harmonic generation. We report here the nonlinear response of the TMMP TaAs through optical rectification of amplified femtosecond laser radiation, a phenomenon related to photogalvanic and nonlinear Hall effects. The emitted rectified radiation is in the Terahertz energy range of around 4 meV and allows us to study electron dynamics close to the Fermi surface.

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