Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

High-harmonic generation from an atomically thin semiconductor HANZHE LIU, YILEI LI, Stanford Univ./SLAC national accelerator laboratory, SHAMBHU GHIMIRE, SLAC national accelerator laboratory, TONY HEINZ, DAVID REIS, Stanford Univ./SLAC national accelerator laboratory — The process of high-harmonic generation (HHG) from ultrashort laser pulses has recently been observed in bulk solids, complementing the well-established process in the gas phase. HHG is of interest both as a source of ultrashort pulses in the attosecond regime that has photon energies extending up to the soft x-ray region and as a method of probing material response outside the regime of perturbative nonlinear optics. In this paper, we present the observation of HHG from a single atomic layer of MoS_2 driven by a strong infrared pulse of 100 fs duration and 0.3 eV photon energy. We observe distinct harmonics up to the 13^{th} order of the infrared excitation. The non-perturbative nature of the HHG process is demonstrated by the weak power dependence of the harmonic intensities. To gain further insight into the process, we have investigated the variation of the HHG signal with sample orientation and the ellipticity of pump excitation. We compare and contrast the process with that from the bulk MoS_2 crystal. We find significant differences in the response for the monolayer and bulk crystal, which can be understood in terms of the distinct crystallographic symmetries in the two cases.

Yilei Li
Columbia Univ

Date submitted: 06 Nov 2015 Electronic form version 1.4