DAMOP17-2017-000524

Abstract for an Invited Paper
for the DAMOP17 Meeting of
the American Physical Society

Anisotropy in high-harmonics from bulk and 2D crystals

SHAMBHU GHIMIRE, Stanford PULSE Institute

We present our experimental results on observation of anisotropic high-order harmonics from bulk and atomically thin 2D crystals. For linear polarization, the rotation of 100 cut bulk MgO crystal around its normal produces a strong 4-fold distribution consistent to its cubic crystal structure [1]. The ellipticity dependence is also strongly anisotropic and depends on the orientation of crystallographic axis with respect to the major axis of laser polarization [1]. We use real-space electron trajectory analysis to investigate the underlying electron dynamics. We also find that much of the anisotropy originates in the crystal structure of solids such as in MoS2, we measure 6-fold distribution dictated by its hexagonal crystal structure [2]. Finally, single layer MoS2 produces additional set of even order harmonics because of the lack of reflection symmetry [2]. The understanding of microscopic origin of anisotropy could lead to an all-optical method suitable for probing the distribution of valance charge density in bulk and 2D crystalline solids. References: [1] Y. You *et al.*, Nature physics, DOI: 10.1038/nphys3955, (2016) [2] Liu *et al*., Nature Physics, DOI: 10.1038/nphys3946, (2016