

Abstract Submitted  
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**Laser waveform control of extreme ultraviolet high harmonic generation in solids** YONG SING YOU, SLAC - Natl Accelerator Lab, MENGXI WU, Louisiana State University, YANCHUN YIN, ANDREW CHEW, XIAOMING REN, SHIMA GHOLAM-MIRZAEI, University of Central Florida, DANA BROWNE, Louisiana State University, MICHAEL CHINI, ZENGHU CHANG, University of Central Florida, KENNETH SCHAFER, METTE GAARDE, Louisiana State University, SHAMBHU GHIMIRE, SLAC - Natl Accelerator Lab — Solid-state high-order harmonic generation (HHG) process has emerged as a novel method to produce attosecond pulses and to probe electronic structure of bulk materials. Much of these applications need time-domain information such as the phase delay between different harmonics at the sub-cycle level. Here, we use few cycle driving pulses to control the generation process in time-domain through carrier-envelope phase (CEP) setting. We find that the XUV harmonic spectrum from MgO depends strongly to the CEP setting. Our analysis based on quantum model shows that such dependence originates from the delay between harmonics at the sub-cycle level. Experimental results show that the delay depends on the strength of the laser field. These features are consistent to the emission from driven multi-band non-linear current. Thus, our results suggest a new approach to study multi-band electron dynamics in strongly driven periodic solids with unprecedented time resolution. The time-domain information we reveal is critical for attosecond pulse metrology based on solid-state HHG.

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