

Abstract Submitted
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High harmonic generation from impulsively aligned SO₂¹ JULIEN DEVIN, SONG WANG, ANDREAS KALDUN, PHIL BUCKSBAUM, PULSE Institute, SLAC - Natl Accelerator Lab — Previous work [1][2] in high harmonics generation (HHG) in aligned molecular gases has mainly focused on rotational dynamics in order to determine the contributions of different orbitals to the ionization step. In our experiment, we focus on the shorter timescale of vibrational dynamics. We generate high harmonics from impulsively aligned SO₂ molecules in a gas jet and record the emitted attosecond pulse trains in a home-built high resolution vacuum ultra violet (VUV) spectrometer. Using the high temporal resolution of our setup, we are able to map out the effects of vibrational wavepackets with a sub-femtosecond resolution. The target molecule, SO₂ gas, is impulsively aligned by a near-infrared laser pulse and has accessible vibrations on the timescale of the short laser pulse used. We present first experimental results for the response to this excitation in high-harmonics. We observe both fast oscillations in the time domain as well as shifts of the VUV photon energy outside of the pulse overlaps. [1] R. Velotta, N. Hay, M. B. Mason, M. Castillejo, and J. P. Marangos. *Phys. Rev. Lett.* 87, 183901 [2] L. Spector, M. Artamonov, S. Miyabe, T. Martinez, T. Seidermann, M. Guehr, and P. Bucksbaum. *Nature Communications* 5, 3190.

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Julien Devin
PULSE Institute, SLAC - Natl Accelerator Lab

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