

Abstract Submitted
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Molecular Self-Probing Spectroscopy with High Harmonic Generation at Long Wavelengths A. CAMPER, S.B. SCHOUN, P. AGOSTINI, OSU, USA, PASCAL SALIERES, LIDyL-CEA Saclay, France, J. CAILLAT, LCPMR-UPMC, France, R.R. LUCCHESI, Texas A&M University, USA, L. DIMAURO, OSU, USA — We used laser driven sub-femtosecond electronic wave packet (EWP) recollision to generate high-order harmonics (HHG) of a 1.3 μm laser pulse in aligned molecules. We performed a tomographic investigation of N_2 [Itatani-Nature2004, HaesslerNatPhys2010, VozziNatPhys2011, DivekiNJP2012] by characterizing the HHG yield and spectral phase of the attosecond emission for different recollision angles of EWP with respect to the main axis of the angular distribution of the molecules. Thanks to the high degree of alignment and to the fine spectral sampling, our XUV quantum phase measurements [SchounPRL2014] reveal subtle features in the recombination dipole moment of N_2 . We interpret the latter within the Quantitative Rescattering Theory [LePRA2009] and emphasize the effect of the EWP scattering on the ion Coulombic potential and of the shape resonance in the X channel of N_2 on HHG [LucchesePRA1982]. Compared to previous results at 800 nm, our experiment is deeper into the tunneling regime and only one ionization channel is enough to explain what we observed. Our results shine a new light on imaging molecular orbitals using laser-driven photo-recombination processes.

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