Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Carrier-envelope phase control over pathway interference in strong-field dissociation of H_2^+ molecular ions[1] M. ZOHRABI, NORA G. KLING, K.J. BETSCH, S. ZENG, F. ANIS, U. ABLIKIM, BETHANY JOCHIM, Z. WANG, M.F. KLING, K.D. CARNES, B.D. ESRY, I. BEN-ITZHAK, J. R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, KS, USA, M. KÜBEL, Max-Planck-Institut für Quantenoptik, D-85748 Garching, Germany — The dissociation of an H_2^+ molecular-ion beam by linearly polarized, carrier-envelope-phase-tagged 5-fs laser pulses is studied experimentally and theoretically. A coincidence 3D momentum imaging technique is employed to fully characterize the dissociation kinematics. We observe carrier-envelope-phase-dependent asymmetries in the emission direction of H^+ fragments relative to the laser polarization for two kinetic energy release regions. These asymmetries are caused by the interference of odd and even photon number pathways [1-2]. In the low kinetic energy region (0.2-0.45 eV), the net-zero-photon and one-photon pathways interfere predominantly while net-two-photon and one-photon interference contributes at the higher kinetic energy region, 1.65-1.9 eV. These measurements are quantitatively compared to ab initio theoretical calculations [1-2] to further our understanding of strong-field coherent control via the carrier-envelope phase.

[1] Nora G. Kling et al. Phys. Rev. Lett. 111, 163004 (2013).
[2] V. Roudnev, B.D. Esry, and I. Ben-Itzhak, Phys. Rev. Lett. 93, 163601 (2004).

[1]Supported by the Chemical Sciences, Geosciences, and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U.S. Department of Energy, Grants DE-FG02-86ER1349 and DE-FG02-09ER16115.

M. Zohrabi
J. R. Macdonald Laboratory, Department of Physics,
Kansas State University, Manhattan, KS, USA

Date submitted: 31 Jan 2014 Electronic form version 1.4