Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Frustrated tunnel ionization in the few-cycle regime[1] R.D. GLOVER, D. CHETTY, A.J. PALMER, Centre for Quantum Dynamics, Griffith University, Australia, B.A. DEHARAK, Illinois Wesleyan University, USA, J.L. HOLDSWORTH, School of Mathematical and Physical Sciences, University of Newcastle, Australia, M.A. DAKKA, A.N. LUITEN, P.S. LIGHT, Institute for Photonics and Advanced Sensing and School of Physical Sciences, The University of Adelaide, Australia, I.V. LITVINYUK, R.T. SANG, Centre for Quantum Dynamics, Griffith University, Australia — Frustrated Tunnel Ionization (FTI) is a strong-field phenomenon where an ultrashort laser pulse excites a target atom, leaving it in a Rydberg state [Nubbemeyer, T., et al. Phys. Rev. Lett. 101(23): 233001 (2008)]. This occurs after a tunneling ionization event when the dominant ionization channel is 'frustrated' by the atomic Coulomb potential. Studying the mechanism behind FTI facilitates our understanding of atomic and molecular strong-field dynamics; e.g. FTI is observed in time-resolved ionization dynamics [Sabbar, M., et al. Nat. Phys. 13(5): 472-478 (2017)] and delayed ionization [Larimian, S., et al. Phys. Rev. A 94(3) (2016)], and the fragmentation of molecules [Manschwetus, B., et al. Phys. Rev. Lett. 102(11): 113002 (2009)]. Here we compare our experimental and theoretical FTI yields for few- and multi-cycle pulses. We find that for the same pulse energy more FTI is generated with few-cycle pulses.

[1]This project is supported under the ARC Linkage Infrastructure, Equipment and Facilities scheme (project LE160100027). B.d. is funded by the US NSF (grants no. PHY-1402899 and PHY-1708108). D.C. is supported by an Australian Government RTP Scholarship.

Bruno deHarak
Illinois Wesleyan Univ

Date submitted: 20 Jan 2018 Electronic form version 1.4