

Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Dynamic Alignment in Enhanced Ionization of Water¹ GREG MCCRACKEN, CHELSEA LIEKHUS-SCHMALTZ, PHIL BUCKSBAUM, Stanford University — The enhanced ionization of water is studied in NIR, ultrafast pulses. "Enhanced ionization" leads to symmetric three body decay from multiple charge states of H₂O. Linearization of the molecule in the strong field is shown to cause dynamic alignment of the H-H bond to the polarization. This a main feature of the enhanced ionization channels. The process by which the molecule unbends is studied extensively by identifying pathways for multiple ionization in the dication states. This is achieved by comparison of channels for different isotopes across a range of intensities. Ionization of inner valence electrons plays a key role. Additionally, it is shown that multiple ionization does not only occur in the enhanced ionization regime, even for longer pulses. Double, sequential tunneling ionization of the lone pair orbital is also observed. Here, alignment to the H-H bond does not occur, and distortion of the molecular frame prior to ionization is minimal. The onset of this channel is at significantly higher intensity than that observed for triple and quadruple ionization channels.

¹Funding provided by the National Science Foundation.

Greg McCracken
Stanford University

Date submitted: 02 Feb 2019

Electronic form version 1.4