

Abstract Submitted  
for the DAMOP10 Meeting of  
The American Physical Society

**Asymmetry in the momentum distribution of  $H+p$  from dissociative ionization of  $H_2$  controlled by the carrier-envelope phase of a few-cycle pulse**<sup>1</sup> SHUO ZENG, FATIMA ANIS, B.D. ESRY, J.R. Macdonald Laboratory, Department of Physics, Kansas State University — We present theoretical results on the interaction of  $H_2$  with an ultrashort linearly polarized laser pulse of 6 fs duration. We investigate the carrier-envelope phase effects of this ultrashort laser pulse on the asymmetry of the momentum distribution of  $H+p$  along the laser polarization direction. To do so, we model the  $H_2$  ionization by launching a coherent wavepacket on  $H_2^+$  potential curves at each field maximum, and then propagate wavepackets in time on  $H_2^+$  Born-Oppenheimer potential curves coupled by the laser. Nuclear rotation and vibration are both included in the Schrödinger equation for  $H_2^+$ . Our results will be compared to a recent experimental measurement [1]. We will also compare our results to calculations neglecting rotation and discuss the limitations of such a model.

[1] Manuel Kremer *et al.*, Phys. Rev. Lett. 103.213003 (2009)

<sup>1</sup>Supported by the Chemical Sciences, Geosciences, and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U.S. Department of Energy.

Shuo Zeng  
J.R. Macdonald Laboratory, Dept of Physics, Kansas State University

Date submitted: 27 Jan 2010

Electronic form version 1.4