Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Carrier-Envelope Phase Effects for Long Wavelength Dissociation of HeH^{+1} D. URSREY, B.D. ESRY, J.R. Macdonald Laboratory, Kansas State University — Much emphasis has been placed on using intense, short laser pulses for coherent control of molecular dissociation. Due to their accessibility to theorists, the majority of these studies have focused on H_2^+ and its isotopes. Control over the spatial asymmetry of the dissociating fragments has been demonstrated in experiments starting from D_2 by varying the carrier envelope phase (CEP) [1]. Theoretical interpretations of the control mechanisms have been provided within a Floquet-like picture [2-3]. We desire to extend the theoretical study of the coherent control of dissociation to heteronuclear systems. Here, we present results on the response of HeH^+, the simplest heteronuclear species with an electronic asymmetry in the standard Born-Oppenheimer approximation, to an intense laser pulse. We study the CEP dependence of the spatial asymmetry and dissociation probability for the system in intense fields with long wavelengths (λ = 800 to 4000 nm). [1] M. F. Kling *et al.*, Science **312**, 246 (2006). [2] V. Roudnev, B. D. Esry, and I. Ben-Itzhak, Phys. Rev. Lett. **93**, 163601 (2004). [3] J. J. Hua and B. D. Esry, J. Phys. B **42**, 085601 (2009).

[1]Supported by the Chemical Sciences, Geosciences and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U.S. Department of Energy.

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Date submitted: 04 Feb 2011 Electronic form version 1.4