Abstract Submitted
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Significant carrier-envelope phase effects for intense, many-cycle laser pulses[1] YUJUN WANG, J.V. HERNÁNDEZ, M. ZOHRABI, BEN BERRY, U. ABLIKIM, NORA G. KLING, TRAVIS SEVERT, BETHANY JOCHIM, K.D. CARNES, I. BEN-ITZHAK, B.D. ESRY, J. R. Macdonald Laboratory, Department of Physics, Kansas State University — Carrier-envelope phase (CEP) effects in strong-field fragmentation are commonly quantified by the spatial asymmetry of the fragments and have generally been attributed to the spatial asymmetry of the laser's electric field which rapidly vanishes for longer pulses. While this intuitive explanation works reasonably well for straightforward processes like atomic ionization, it fails in general for processes like molecular dissociation. The general theory in [1] was thus developed to provide a universal explanation of CEP effects based on a photon picture. Interestingly, this theory predicts that CEP effects do not depend on a short pulse duration or a field asymmetry, but rather on the laser bandwidth (consistent with a claim in Ref. [2])—largely independent of the pulse length. Our numerical calculations verify this prediction for pulse lengths of at least 10 cycles in both H and H_2^+. Moreover, we have experimental verification of this prediction for broad bandwidth lasers chirped up to ∼7 cycles—the longest pulse showing CEP effects to date. [1] V. Roudnev and B. D. Esry,Phys. Rev. Lett. 99, 220406 (2007); J. J. Hua and B. D. Esry, J. Phys. B 42, 085601 (2009). [2] T. Nakajima and E. Cormier, Opt. Lett. **32**, 2879 (2007).

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