Abstract Submitted for the DAMOP09 Meeting of The American Physical Society

Strong field Cooper minimum in High Harmonic Generation JOSEPH FARRELL, BRIAN MCFARLAND, PHIL BUCKSBAUM, MARKUS GÜHR, Stanford PULSE Institute — The Cooper minimum is a prominent dip in the VUV photoionization spectrum in Ar caused by a cancellation of the radial integral in the transition matrix element between the atomic ground state and the continuum. The minimum is accompanied by a π phase jump in the matrix element [1]. The recombination step of High Harmonic Generation (HHG) can be described by the inverse photoionization matrix element. We observe a similar minimum in the HHG spectrum of argon, which we associate with the Cooper minimum. We have measured the spectral phase of the harmonics and observe the expected spectral phase jump of π around this spectral minimum. This HHG Cooper minimum is shifted from the photoionization Cooper minimum by about 5 eV. Calculations show that this shift is due to strong-field mixing of the continuum states during the recombination step in HHG. The results show the opportunity for controlled attosecond pulse shaping. [1] J. W. Cooper, Physical Review 128, 681 (1962)

¹Supported by the U.S. Department of Energy Division of Basic Energy Sciences through the PULSE Institute at the SLAC National Accelerator Laboratory, and by a Humboldt Foundation fellowship (M.G.).

Joseph Farrell Stanford PULSE Institute

Date submitted: 23 Jan 2009 Electronic form version 1.4