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High Harmonic Imaging of Conical Intersections[1] MARKUS GUEHR, BRIAN K. MCFARLAND, JOE P. FARRELL, PHILIP H. BUCKSBAUM, Stanford PULSE Center, Stanford University, Stanford, CA 94305 — Conical intersections (CI) are crucially involved in light harvesting, primary visual processes, DNA UV stabilization and atmospheric chemistry. A wave packet typically moves through the intersection on a femtosecond time scale, demonstrating the need for ultrafast tools that are sensitive to the electronic state change occurring in passing the CI. We propose a novel femtosecond pump-probe scheme based on high harmonic generation (HHG). A first pulse (pump) creates a molecular wave packet on excited electronic surfaces, and the time delayed, high intensity probe pulse produces HHG on the excited molecule as it moves through the CI region. We use the symmetry of the electronic wave functions [1] to detect the electronic state change in the CI via HHG. Furthermore, we use two center interference effects in the HHG [1] to determine the nuclear dynamics that is accompanied by the CI passage. To demonstrate our scheme, we perform simple model calculations on the triatomic molecule SO_2, which will be ideally suited for experiments because of its high UV excitation cross sections for pumping the wave packet to the CI region. [1] J. Itatani et al, Phys. Rev. Lett., **94**, 123902 (2005) [2] T. Kanai et al, Nature, **435**, 470 (2005)

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