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High Harmonic Generation in Sulfur Dioxide[1] LIMOR S. SPECTOR, JOSEPH P. FARRELL, BRIAN K. MCFARLAND, Stanford University, PHILIP H. BUCKSBAUM, SLAC National Accelerator Laboratory, Stanford University, MARKUS GUEHR, SLAC National Accelerator Laboratory — We show results of high harmonic generation (HHG) on the triatomic molecule sulfur dioxide. This molecule is one of the simplest systems having a conical intersection (CI), a region of electron degeneracy in which the Born-Oppenheimer approximation breaks down. A CI of particular interest exists between the excited electronic $^1B_1$ and $^1A_2$ states in the sulfur dioxide molecule. This CI can be reached via a direct Frank-Condon transition from the electronic ground state. The ionization and recombination steps of HHG render HHG a sensitive probe of electronic structure. HHG thus allows us to monitor electronic symmetry changes within the CI region, which has been shown to contain contributions from multiple orbitals [McFarland et al. *Science* 2008]. We spectrally resolve the high harmonics of the ground and excited states of sulfur dioxide to characterize the CI, paving the way for a more complete understanding of non-Born-Oppenheimer dynamics.

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