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Development of a High Harmonic Beamline for Time-Resolved XUV Spectroscopy EMILY SISTRUNK, JAKOB GRILJ, MARKUS GUEHR, PULSE Institute and Chemical Science Division, SLAC, Menlo Park, CA 94025 — In order to better understand bond breaking and other photochemical processes it is critical to determine the valence electron dynamics occurring during such phenomena. Extreme ultraviolet (XUV) light induces transitions between narrowly confined core electronic states and valence states. Thus ultrafast XUV absorption provides a route to determine electron distributions during chemical change. We present the design of our new femtoseconds XUV absorption spectrometer. The XUV pulses are generated in a rare gas cell in a high harmonic generation (HHG) process. Strong laser field HHG yields a promising probe source in the 10-100 eV spectral range, making it an ideal tool for XUV absorption spectroscopy of molecules containing 3d transition metals with $M_{2,3}$ edges between 40-70 eV. The femtosecond duration pulses intrinsically produced by HHG allow for the necessary temporal resolution. We plan to study organometallic molecules such as the transition metal carbonyls which undergo ligand dissociation under the influence of ultraviolet light. After UV excitation a radiationless non-Born-Oppenheimer processes occur before dissociation. The understanding of these non-Born-Oppenheimer dynamics is important to the general field of photocatalysis. This work is supported by the Office of Science Early Career Research Program.

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