# HIGH HARMONIC GENERATION XUV SPECTROSCOPY FOR STUDYING ULTRAFAST PHOTOPHYSICS OF COORDINATION COMPLEXES

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Extreme ultraviolet (XUV) spectroscopy is an inner shell technique that probes the $M_{2,3}$-edge excitation of atoms. Absorption of the XUV photon causes a 3p→3d transition, the energy and shape of which is directly related to the element and ligand environment. This technique is thus element-, oxidation state-, spin state-, and ligand field specific. A process called high-harmonic generation (HHG) enables the production of ultrashort (~20fs) pulses of collimated XUV photons in a tabletop instrument. This allows transient XUV spectroscopy to be conducted as an in-lab experiment, where it was previously only possible at accelerator-based light sources. Additionally, ultrashort pulses provide the capability for unprecedented time resolution (~70fs IRF). This technique has the capacity to serve a pivotal role in the study of electron and energy transfer processes in materials and chemical biology. I will present the XUV transient absorption instrument we have built over the past two years, along with preliminary data and simulations of the $M_{2,3}$-edge absorption data of a battery of small inorganic molecules to demonstrate the high specificity of this ultrafast tabletop technique.

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