X-ray absorption near edge spectroscopy (XANES or NEXAFS) is a powerful technique for electronic structure determination. However, widespread use of XANES is limited by the need for synchrotron light sources with tunable x-ray energy. Recent developments in extreme ultraviolet (XUV) light sources using the laser-based technique of high-harmonic generation have enabled core-level spectroscopy to be performed on femtosecond to attosecond timescales. In this work, we extend the scope of tabletop XUV spectroscopy and demonstrate that M_{2,3}-edge XANES, corresponding to 3p→3d transitions, can reliably measure the electronic structure of first-row transition metal coordination complexes with femtosecond time resolution. In semiconductors such as CH$_3$NH$_3$PbI$_3$, distinct signals are observed for photoinduced electrons and holes, allowing the dynamics of each carrier to be tracked independently. This work establishes high-harmonic spectroscopy as a useful tool for mainstream research in inorganic, organometallic, and materials chemistry.

Refreshments served at 1:45 pm in 331 Klamath Hall
Hosted by Cathy Wong