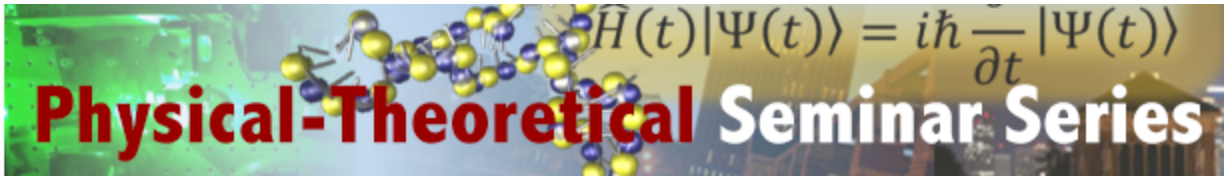

Monday, November 5, 2018, 12:00 pm
Seaver Science Library, Room 150
SSC Auditorium next to the library

Professor Josh Vura-Weis

Department of Chemistry
University of Illinois at Urbana-Champaign

Ultrafast extreme ultraviolet spectroscopy reveals short-lived states in transition metal complexes and organohalide perovskite semiconductors

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. We have extended the scope of tabletop XUV spectroscopy and demonstrated 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. We use this ability to track the excited-state relaxation pathways of photocatalysts and spin crossover complexes. In semiconductors such as $CH_3NH_3PbI_3$, distinct signals are observed for photoinduced electrons and holes, allowing the dynamics of each carrier to be tracked independently. This work establishes extreme ultraviolet spectroscopy as a useful tool for mainstream research in inorganic, organometallic, and materials chemistry.

Hosted by Professor Alexander Benderskii

The scientific community is invited

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