

# Going Forward – Recent Surprises in Stimulated X-ray Emission Spectroscopy

Uwe Bergmann

Wednesday, September 4  
3:00 p.m.  
Bldg. 402 | APS Auditorium

We present our progress in exploring the phenomenon of stimulated X-ray emission spectroscopy (S-XES) as a new spectroscopy tool, and as a new source of ultrafast X-ray pulses. We first discuss the principle of S-XES, and the experimental methods required for generating and measuring it. We then discuss recent results for spectroscopy applications of S-XES and its potential and challenges of providing enhanced chemical sensitivity as compared to linear X-ray emission spectroscopy. In the second half of the talk, we discuss applications of S-XES as a new X-ray source. Here we present our progress in building a population inversion X-ray laser oscillator, for generating intense, stable, transform-limited X-ray laser pulses as well as several unexpected results for generating X-ray pulses with unique properties.

Uwe Bergmann earned his PhD in Physics from Stony Brook University and is the Martin L. Perl Professor in Ultrafast X-ray Science in the Department of Physics at the University of Wisconsin-Madison. His research activities focus on the development and application of novel synchrotron and X-ray laser techniques. His scientific interests include studies of the structure of water and aqueous solution, active centers in metalloproteins with focus on photosynthetic splitting of water, hydrocarbons and fossil fuels, functional 2D materials and magnetic membranes, and imaging of ancient materials and fossils. Bergmann has done his graduate research at the National Synchrotron Light Source and since worked at the European Synchrotron Radiation Facility, the Lawrence Berkeley National Laboratory, the Stanford Synchrotron Radiation Lightsource, the Linac Coherent Light Source, and at the Stanford PULSE Institute at SLAC National Accelerator Laboratory.

