Ultrafast X-ray Studies of Structural Dynamics

Kelly J. Gaffney, *Stanford Synchrotron Radiation Laboratory, Stanford Linear Accelerator Center, Stanford University, Menlo Park, CA USA*. E-mail: kgaffney@slac.stanford.edu

The physical and chemical transformation of matter on the atomic scale typically occurs in many femtoseconds to a few picoseconds and involves the motion of atoms on the Ångström length scale. The unique capabilities of linac based light sources match the natural time and length scale of structural dynamics and provide scientists with an outstanding opportunity to better understand the chemical and physical transformations of matter. Results from the recently commissioned Sub-picosecond Pulse Source (SPPS) at the Stanford Linear Accelerator Center (SLAC) will be utilized to highlight the unique capabilities and challenges of linac based ultrafast light sources. The projected capabilities of the Linac Coherent Light Source (LCLS) and a brief description of the science it will enable will also be discussed.

Keywords: time-resolved structural studies, femtosecond x-ray sources, x-ray free electron lasers