Ultrafast diffraction experiments at the Sub-Picosecond Pulse Source at SLAC.
M. Nicoul, K. Sokolowski-Tinten, D. von der Linde
Institut für Experimentelle Physik, Universität Duisburg-Essen

Introduction:
Current 3rd generation synchrotrons provide high brightness X-rays for static structural investigations but are not designed to study ultrafast phenomena due to their long pulse duration (~100ps). The future X-ray Free Electron Lasers will produce X-ray pulse of extreme brightness with femtosecond pulse duration. This unique combination of brightness and pulse duration will allow to study ultrafast dynamics.

However, to fully utilize the potential of these future light sources new experimental techniques need to be developed which combine ultrafast lasers with accelerators. The Sub-Picosecond Pulse Source (SPPS) was build at the Stanford Linear Acceleration Center for this purpose.

During its time of operation (2003 - 2006) we have used the SPPS for time resolved X-ray diffraction experiments to study ultrafast lattice dynamics in laser-excited solids.

Sub-Picosecond Pulse Source (SPPS) at Stanford Linear Accelerator Center (SLAC):

EO-Sampling: measurement of X-ray arrival time

Ultrafast Melting in InSb: Single-shot Experiment

Ultrafast Melting in InSb: Liquid Phase Scattering

Contact: matthieu.nicoul@uni-due.de
About SPPS: http://www-ssrl.slac.stanford.edu/jbh/


Non-invasive single-shot laser - e-beam cross correlator.