

Applications of short laser pulses in x-ray and photoacoustic experiments

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Application of short laser pulses and photoacoustic devices can provide a variety of options for improvement of time-resolved x-ray diffraction and reflectivity measurements. The x-ray pulse selection on nanosecond time-scale for synchrotron based experiments can be achieved by diffraction from a thermal grating created by an interference of two laser pulses. A reduction of x-ray pulse length to a few picoseconds can be obtained with help of a laser pumped photoacoustic device called PicoSwitch.[1] Ultra short laser pulses also allow creating and controlling acoustic waves in solids and nanostructures. [2]

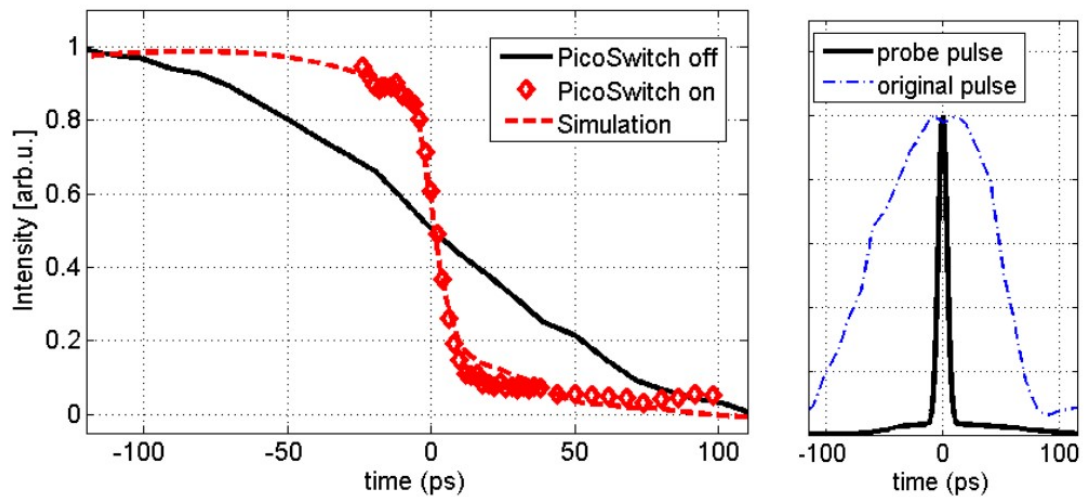


Figure 1 : Reduction of x-ray pulse length to a few picoseconds by using PicoSwitch device. [1]

This talk will present some of the applications of short laser pulses, laser induced transient gratings and photoacoustic devices in x-ray diffraction/reflectivity and beyond.

References

- [1] M. Sander, R. Bauer, V. Kabanova, M. Levantino, M. Wulff, D. Pfuetzenreuter, J. Schwarzkopf and P. Gaal, *J. Synchrotron Rad.* 26, 1253-1259 (2019)
- [2] M. Sander, J.-E. Pudell, M. Herzog, M. Bargheer, R. Bauer, V. Besse, V. Temnov, and P. Gaal, *Applied Physics Letters* 111, 261903 (2017)