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# Applied pump-probe X-ray diffraction at synchrotrons

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Synchrotron X-ray sources are among most convenient radiation sources for carrying out time-resolved pump-probe X-ray scattering experiments. Many synchrotron beamlines are currently being equipped with ps and fs lasers to enable laser pump X-ray probe diffraction experiments. At most advanced femtoslicing beamlines the time resolutions below one picosecond is currently achieved. With the progress in X-ray detector technology and the possibility of an electronic detector gating the number of beamlines that offer capability of carrying-out pump-probe experiments is now rapidly increasing.

In the talk we will show several examples of pump-probe X-ray diffraction experiments applied to studies of coherent lattice excitations in solids and in surface science applications. We will disclose the technical details of the XPP beamline (BESSY, Berlin) designed for high-repetition rate pump-probe X-ray diffraction experiments. A newly built mobile nanosecond surface X-ray diffraction setup will be described and recent data from the ESRF ID03 beamline demonstrating the proof-of-concept will be presented.

Technical questions such as preferred synchrotron bunch structure, laser repetition rate, data acquisition pipeline etc. will be discussed in the context of pump-probe X-ray diffraction.

## Summary

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