Ultrafast X-ray absorption spectroscopy with present and future

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Ultrafast X-ray absorption spectroscopy is a young subject. It requires a high flux, tunable source of ultrashort X-ray pulses, and this is the reason why most studies in recent years have been carried out at synchrotrons, with a resolution of typically 50-100 ps. We will review some of the recent results on molecules in solution, obtained in a laser pump/X-ray probe scheme. These results also allow us to "calibrate" future experiments in the light of the upcoming 4th generation sources. Estimates of the typical fluxes and pulse widths required for successful experiments will be given and discussed.