

Structural Dynamics With Current and Future X-Ray Sources

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Following structural dynamics on the picosecond and femtosecond time scales is one of the frontier areas in Femtochemistry on condensed matter systems. With established structural tools like x-ray absorption spectroscopy (XAS) or diffraction methods it is possible to observe the structural changes during a photochemical reaction. Extending such studies in the long term to, e.g., biomolecular systems may provide unique insights in the nature of biological functions.

We present our current efforts to visualize the formation of photoexcited aqueous product species (e.g., short-lived radicals) exploiting hard x-radiation from a dedicated time-resolved x-ray beamline at the Advanced Light Source. Hereby we probe the temporal evolution via x-ray absorption spectroscopy methods like EXAFS. The results quantify the general feasibility, and model calculations are presented, which permit us to link the current results with more challenging experiments as well as to evaluate the utility of alternative sources of ultrashort x-rays.