

Protein structure and dynamics using X-ray free-electron lasers
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The femtosecond X-ray pulses provided by X-ray free-electron lasers (XFELs) allow studying light-induced processes on the ultrafast time-scale, with crystallography enabling visualization at high spatial resolution. In combination with results from transient spectroscopy and computation, this approach can provide unprecedented insight through structures of short lived states, including excited state intermediates and by following protein dynamics. Recent examples will be presented, including the necessary new approaches for sample preparation, delivery, data collection and analysis.