



ESRF

Experiment title: Nanosecond time-resolved investigation of photoinduced structural changes in heme proteins.

Experiment number:
LS541

Beamline:

ID9

Date of experiment:

from: 20-November-96 to: 1-December-96

Date of report:

26-Feb-96

Shifts:

9 sb+8 2/3fill
shared with
LS540

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Received at ESRF:

01 MAR. 1999

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Report:

In November 96 experiment LS541 we continued our attempt to collect high quality ns time-resolved crystallographic data on the photoproduct of carbonmonoxy myoglobin (MbCO) that will allow us to refine the photoproduct model. MbCO photolysis is a reversible process and therefore, in principle, allows signal averaging by repeated crystal photolysis with a frequency of ~0.1-1 Hz. This frequency is determined by the time needed for dissipation of laser-deposited thermal energy rather than the ligand rebinding kinetics, which occur within 100 μ s. As we have already stated in May 96 (LS427), we employed a strategy of signal averaging where the repeated X-ray exposures are accumulated on the CCD detector. This allows a relatively rapid data collection (about 1h per data set of 50 images). In May 96 we recorded 5-15 accumulated X-ray exposures depending on the size of the crystal, in November 96 we recorded typically 30 exposures. Utilizing the single bunch mode we collected complete data sets at a series of laser/X-ray delay times in the ns time domain: 7.3 ns, 11.6 ns, 15.4 ns, 40.9 ns, 58.6 ns, 101.9 ns, 283 ns and 785 ns. We expect that this and May 96 data will complement the data we collected in April 95, for which only one time delay < 1 μ s was recorded and six time delays between 1 and 1900 μ s. Both data sets were collected using wiggler W70 and undulator U46 in series. We also explored the Laue data collection with a narrow band undulator and collected 3.5ns data set using undulator U26. Data processing for both May 96 and November 96 data sets is in progress.