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ERATO Non-Equilibrium Dynamics Project

4-1 Outline

The Non-Equilibrium Dynamics Project under the Exploratory Research for Advanced Technology (ERATO) program of Japan Science and Technology Agency (JST) was launched at the northwest site of the PF-AR in October 2003. This is a five-year project lead by Professor Shin-ya Koshihara (Tokyo Institute of Technology). The KEK branch of the project has been mainly devoted to (1) construction of the beamline NW14A at PF-AR and (2) development of 100-ps time-resolved X-ray applications. The project consists of more than 10 members, including researchers, students and administrative staff. Collaborations with foreign and domestic research groups are also in progress.

4-2 Beamline Construction and Development

The construction of NW14A for the time-resolved X-ray diffraction, scattering and absorption experiments was finished in summer 2005, and NW14A is now fully operational. The technical details of the beamline were published in 2007 [1].

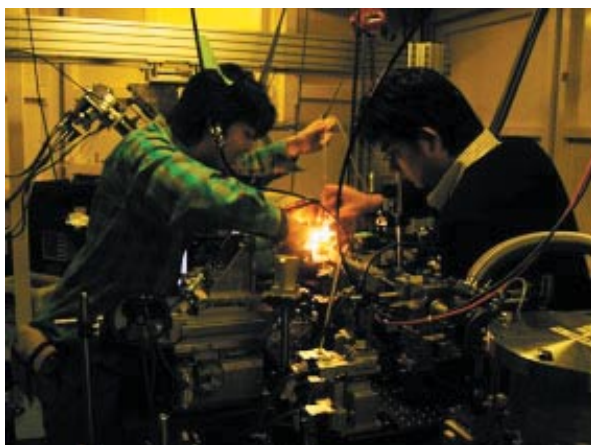


Figure 1
A snapshot during the time-resolved liquid scattering beam time.

4-3 100-ps Time-resolved X-ray Applications

Time-resolved X-ray techniques utilizing the pulsed nature of synchrotron radiation are becoming general and powerful tools to explore structural dynamics in materials and biological sciences. This technique can be applied to most of the synchrotron radiation methodologies, and we have been applying such capabilities to wide range of subjects as follows.

- (1) photochemical reaction dynamics in liquid studied by time-resolved XAFS and solution scattering (Fig. 1).
- (2) laser-induced shockwave generation and ultrafast compression of materials studied by time-resolved diffraction [2].
- (3) light-induced response of photosensitive protein molecules.
- (4) photo-induced cooperative phenomena in strongly-correlated electron systems.

We are also planning to develop time-resolved X-ray imaging technique in the near future. Most of the outputs are published or submitted for publications. We hope to let our works published in 2008 (the last year of the project).

REFERENCES

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- [2] K. Ichiyanagi, S. Adachi, S. Nozawa, Y. Hironaka, K. G. Nakamura, T. Sato, A. Tomita and S. Koshihara, *Appl. Phys. Lett.*, **91** (2007) 231918.