

Pursuing structural dynamics of materials by short pulsed X-rays at PF-AR

Shin-ichi Adachi¹, Shunsuke Nozawa¹, Tokushi Sato¹, Kouhei Ichiyangi², Ayana Tomita³, Manabu Hoshino³ Shin-ya Koshihara³ and Hiroshi Kawata¹

1. Photon Factory, Institute of Materials Structure Science, High Energy Accelerator Research Organization, 1-1 Oho, Tsukuba, Ibaraki 305-0801, Japan

2. Graduate School of Frontier Sciences, The University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8561, Japan

3. Department of Materials Science, Tokyo Institute of Technology, 2-12-1 Oh-okayama, Meguro-ku, Tokyo 152-8551, Japan

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 method enables to produce structural movies at 100-picosecond temporal and sub-nanometer spatial resolution. It will be fascinating to apply such capability to capture ultrafast phenomena in strongly-correlated electron systems, photochemical reactions in liquid or on solid surface, light-induced response of photosensitive protein molecules, etc.

Photon Factory Advanced Ring (PF-AR) at the High Energy Accelerator Research Organization (KEK), Tsukuba, Japan is a 6.5-GeV electron storage ring dedicated for single-bunch operation and is suitable for the time-resolved X-ray studies. We have constructed an in-vacuum undulator beamline NW14A at the PF-AR, which is designed to conduct a wide variety of time-resolved X-ray measurements, such as time-resolved diffraction, scattering and absorption. The current status of the beamline and examples of applications to photo-induced phenomena will be presented.