

PREFACE

It is my great pleasure to share our research highlights based on the Photon Factory (PF) users' program during fiscal 2022 (April 2022 – March 2023). Since the PF users' program started in 1983, more than 20,000 research papers have been published. We are proud to have produced a considerable number of papers describing breakthroughs in broad areas of materials and life sciences. I hope that this latest issue of PF Highlights will lead to new discoveries in scientific studies.

The PF launched its new organization in 2019, to strengthen its facility and research capabilities. While many light source facilities have been built or planned around the world, the PF has been reborn by returning to its roots. The primary mission of the PF is to nurture new techniques and young people to lead synchrotron-radiation science through R&D. The second mission is to promote various researches related to materials and life as an advanced infrastructure facility.

In the previous issue, as a long-term future plan, we reported on the conceptual design of our new facility, the Photon Factory Hybrid Light Source (PF-HLS), which will make many kinds of two-beam applications possible. The PF-HLS consists of a storage ring and a superconducting linac. The plan is to build the ring first and the linac later, and the technical design of the ring is now in progress. Tentatively, the storage ring has a circumference of 750 m, a switchable electron energy of 2.5 GeV/5.0 GeV and hence a wide wavelength range, and many long straight sections where multiple insertion devices can be installed. The PF-HLS will consume 25–35% less electricity than the PF/PF-AR. We will report more details in the next issue.

Until the PF-HLS is realized, as a short-term future plan, beam stabilization of the PF ring and reconstruction of BL-11 and BL-12 are under way (background of the picture). BL-11A and -11B are beamlines dedicated to R&D, enabling trial runs of innovative ideas in beamline sciences, including two-beam applications by simultaneous use of the two beamlines. BL-12A is a prototype beamline for wide wavelength applications with a diffraction grating and a double-crystal monochromator covering an energy range from 50 eV to 5000 eV. The construction of BL-11A and -11B has just started, and BL-12A is scheduled to be completed by the end of fiscal 2023.

The PF will successfully carry out its missions with these short-term and long-term future plans.

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