

次期放射光源 ERL 計画の現状 Present Status of the ERL Project as a Future Light Source

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The energy recovery linac (ERL) being developed at KEK could help usher in a new era in materials science. Illumination of a specimen with a short, coherent, nanometer-wide X-ray beam will enable scientists to conduct nondestructive measurements on rapidly evolving dynamical materials and microorganisms with nanometer spatial resolution. This would benefit research for a host of applications in materials, life, chemical, and environmental sciences. Some interesting examples include the development of next-generation high-speed communication devices and catalysts for clean hydrogen energy and other applications for drug-discovery research, sub-cellular imaging, and efficient light energy utilization. To this end, we had settled a combination of 3GeV class ERL and 6GeV XFEL-O as the future light source.

As the first stage, 3 GeV class ERL will be constructed for the experiments by means of high brilliant soft X-ray and hard X-ray with sub-pico second pulsed synchrotron radiation. The merits of changing the energy are as follows; one is the wide varieties of user's demands such as spectroscopy measurements to investigate the electron states in materials by means of soft X-ray to coherent hard X-ray imaging to investigate the electron structure in materials. In addition to the first stage of the construction of ERL, the 6GeV XFEL-O will be a second phase construction. 3 GeV class ERL accelerator automatically can produce enough quality electron beams to realize the XFEL-O with the double acceleration. Therefore, the second phase can be achieved by just the construction of the 50-60m undulator and the X-ray resonator by using diamond crystal optics. We have a planning to start the user's operation from about 2020 for the first stage of ERL user facility.

At the presentation, we will also present the present status of the R&D and construction of the compact ERL in the ERL test facility in KEK.

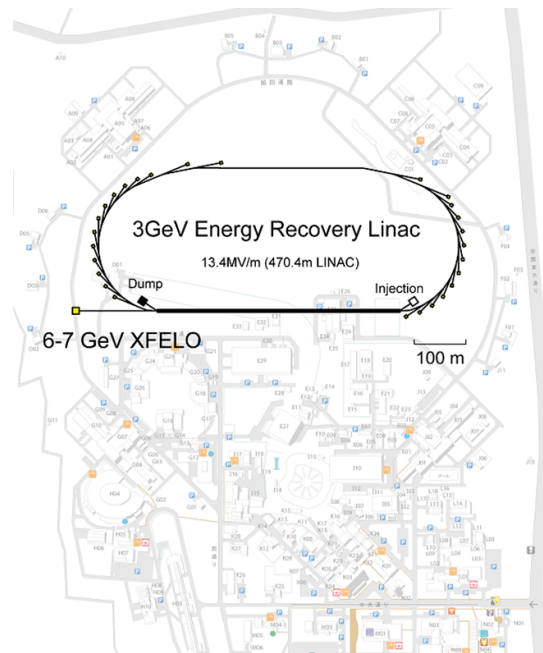


Fig. 1: Layout of the 3GeV ERL and 6-7 GeV XFEL-O



Fig. 2: Installation of the super conduction cavity for injector in the compact ERL at July of 2017