Outline of Beamlines at cERL

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In order to demonstrate required accelerator technologies in the 3 GeV ERL light source, cERL, which is now under construction, is starting an operation with 35MeV and 10 mA during 2012. Along with the operation, the quantum beam obtained from cERL is providing to user experiments. In 2013, the construction of beamlines for advanced researches using hard x-ray and terahertz (THz) beams is starting (Fig. 1).

Due to an inverse Compton scattering (ICS) of laser pulses on relativistic electron bunches in a ring of the cERL, ultra-short hard x-ray is produced [1]. The 100 fs hard x-ray beam from cERL, which is generated by the ICS using high-power and ultra-short laser pulses, is significantly benefit for researches in the field of ultrafast science. On the other hand, high-flux x-ray, which is generated by the ICS using an optical build-up cavity and high-frequency laser pulses, is an ideal light source for an x-ray imaging. In view of using these hard x-rays from the cERL, the construction of the user beamline, which consist of the laser for ICS, an x-ray focusing mirror, a x-ray shutter, and an x-ray experimental hutch, is under consideration.

Furthermore, the coherent synchrotron radiation (CSR) from electronic Bunch in cERL can be used as a novel light source for researches of physical properties, because it has high intensity in a THz region [1]. In addition to the hard x-ray beamline, construction of the THz beamline which has a “magic mirror” for collecting CSR with a large acceptance angle, a beam duct, and a beam transport system is also being discussed

[1] Design study of the compact ERL, R. Hajima, N. Nakamura, S. Sakanaka, and Y. Kobayashi, KEK Report 2007-7

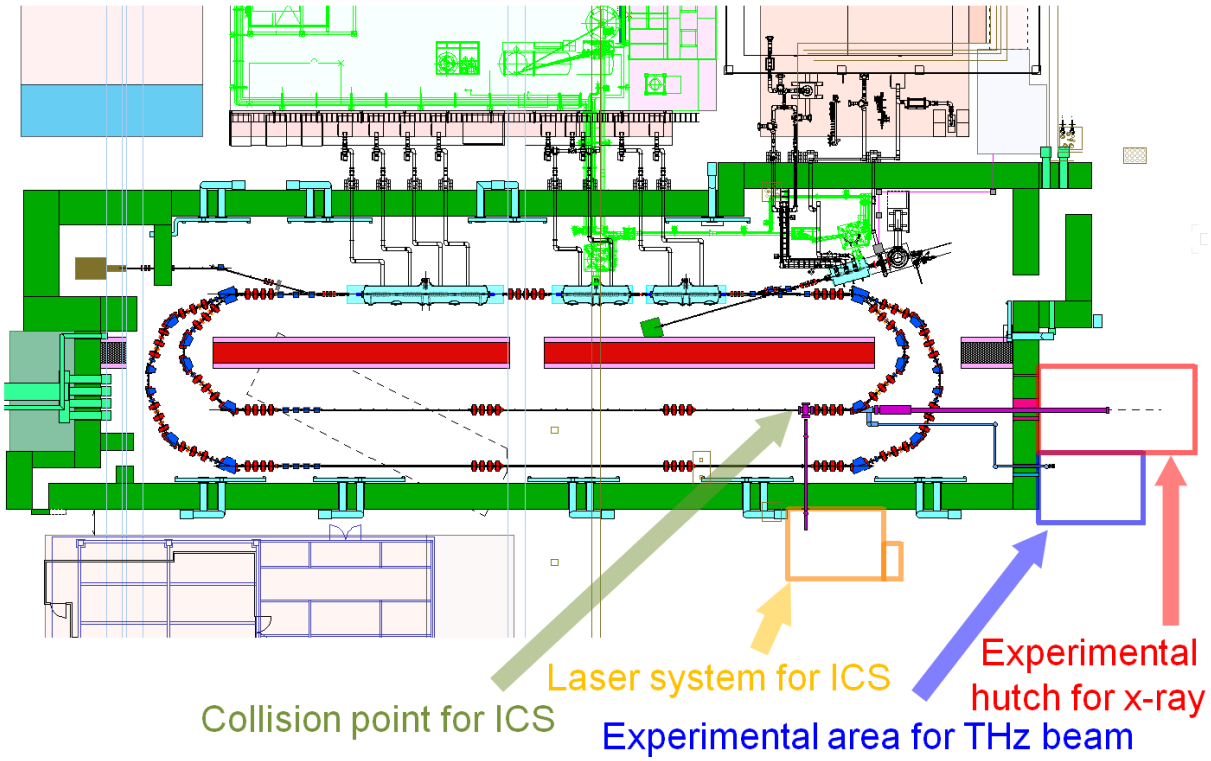

Fig. 1 Schematic plan of x-ray and THz beamlines at cERL