

Present status of Energy Recovery Linac Project

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The 5 GeV class Energy Recovery Linac (ERL) should be the most promising candidate to progress the new synchrotron radiation activities which are based on sub-pico second pulses and/or spatially coherence of the synchrotron radiation, as well as to support a large variety of user needs. The value of the emittance of the electron beam is the order of 10 pmrad, which corresponds to the value of the emittance of 10keV photon itself, so that the x-ray from the ERL is expect to have a good spatial coherence, and also the value of the bunch width is the order of the order of 100 femto-second to open the scientific field of the dynamics of the material science.

To this end, the official organization of the ERL project office has started at KEK from 1st of April 2006. An R&D team for a compact ERL has been organized in collaboration with accelerator scientists from JAEA, ISSP, UVSOR, Spring-8 and AIST. Since there is no GeV-class ERL machine in a world now, it is necessary to construct the compact ERL with the energy of 60~200 MeV to develop several critical components. In 2006 and 2007, we concentrate the designing and development of the machine and key accelerator components such as super-conducting cavities, High brilliant electron gun with high current operation, and beam dynamics issues. The CDR of the compact ERL was completed at the March of 2008. The compact ERL will bring us not only the opportunity as a test facility for several accelerator components but also characteristic scientific cases based by such as high intense THz radiation which is produced as a coherent synchrotron radiation (CSR) from short electron bunch and/or laser-inversed Compton X-ray source which will give us a scientific opportunities of femto-second X-ray or X-ray imaging by a fine point source. The present status of the ERL project including the scientific case, and the detail of the R&D will be presented at the symposium.