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Simulation studies on optimization of hard and soft X-ray beamlines for parallel user service at the PAL-XFEL

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PAL-XFEL (Pohang Accelerator Laboratory X-ray Free Electron Laser) is a facility that generates high-brightness FEL for users to perform the FEL-based sciences. Currently hard and soft X-ray (HX/SX) beamlines are operational, but the parallel operation can be done with less than 60 Hz using a single electron bunch from the electron injector. Therefore, for the user service with maximum repetition rate of 60 Hz on both HX and SX beamlines, a scheme that uses two bunches from the injector with an exact single cycle of 2.856 GHz frequency is under consideration. Particularly, simulation study is necessary to understand the optimal accelerator condition for both HX and SX since the SX shares the same accelerator condition up to the third accelerating column with the HX beamline. In this study, we show discussions using the particle tracking simulations showing the optimal conditions for both beamlines. We also present the potential issues to be considered in the actual operations such as error of RF cavity amplitude.

Footnotes

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