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Development of pulse-by-pulse RF switching in PAL-XFEL LLRF for dual beamlines

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Though XFEL(X-ray Free Electron Laser) machines can produce X-ray pulses over 100 million times brighter than storage-ring-based machines, the XFEL machines have very limited beamlines of 1~3. PAL-XFEL machine includes one hard and one soft X-ray beamlines, but only one beamline can be serviced at each shift period. Efforts to operate the beamlines of PAL-XFEL simultaneously have been made in a manner that bunches of repetition rate 60Hz are directed to each beamline in pulse-by-pulse and real-time style. Because function of real-time and pulse-by-pulse RF-parameter switching was also essentially required for PAL-XFEL LLRFs not had been considered at all, a development was performed by software modification of PAL-XFEL LLRFs without changing any related hardwares. PAL-XFEL including this function of LLRFs was operated without any problem in test operation. It is expected usual and simultaneous service of beamlines near future.

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