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Design of RF system for 4th generation storage ring at Korea

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A new 4th Generation Storage Ring (4GSR) will be constructed in Ochang, South Korea, by the end of 2029. A technical design review for the Korea 4GSR was completed at the end of 2023. The storage ring has a circumference of 799 meters and is designed for a maximum current of 400 mA at 4 GeV electron beam energy. The target emittance is below 100 pm-rad, with a calculated emittance of 62 pm-rad—100 times smaller than that of PLS-II, a 3rd-generation storage ring in Korea. The RF system for the Korea 4GSR comprises 10 normal-conducting cavities, a low-level RF (LLRF) system, a high-power RF (HPRF) system, and additional components. To ensure beam stability, Higher Order Mode (HOM)-damped cavities have been implemented. Additionally, we plan to install harmonic cavities to improve beam lifetime and reduce wakefields. For the LLRF system, we aim to apply a new digital feedback control scheme and implement FPGA chips. For the HPRF system, we have chosen to use a solid-state RF power amplifier (SSPA). This presentation highlights the design results of the RF system for the Korea 4GSR, as well as prototypes of the 3rd harmonic cavity and SSPA.

Footnotes

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