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Pulsed magnetic field measurement of the Nonlinear kicker for Korea-4GSR

The multipurpose synchrotron radiation accelerator (4GSR), supported by Pohang accelerator laboratory (PAL), aims to achieve an ultralow emittance of less than $100 \text{ pm} \cdot \text{rad}$, which requires a significantly reduced dynamic aperture size. The existing local bump injection scheme, which uses four kicker magnets to inject the beam, is unsuitable for 4GSR because it demands a large dynamic aperture. To solve this problem, PAL is researching the implementation of an injection method utilizing a single nonlinear kicker (NLK), with a prototype NLK made of G10 material. The magnetic field measurement system integrates the voltage across a single long coil to measure the magnetic field. It has an accuracy of less than $10 \text{ } \mu\text{m}$ on each axis and can measure a space of $470 \text{ mm} \times 50 \text{ mm} \times 750 \text{ mm}$. The pulsed power supply is constructed with solid-state switches, capable of supplying a maximum pulse current of 10 kA for $7 \text{ } \mu\text{s}$.

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