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Development of High-Precision Beam Position Monitor for the Korea-4GSR project

The Korean 4th Generation Synchrotron Radiation (4GSR) storage ring project is currently under construction in Ochang, South Korea, with the goal of achieving the first beam commissioning in 2027. To achieve an emittance approximately 100 times smaller than that of third-generation synchrotron radiation storage rings, this project requires the development of several high-precision beam diagnostic devices. In particular, the Beam Position Monitor (BPM) aims to reduce longitudinal wake impedance to suppress heating and beam instability. A total of 440 BPMs are needed, spanning from the linear accelerator, LTB, booster, BTS to storage ring with 799.26m circumference, and all BPMs will be manufactured as button types. In this presentation, we will discuss the development of two types of 4GSR BPM pickup antennas: one utilizing a SiO_2 glass insulator and another designed in a cone shape using Al_2O_3. Additionally, we will describe the performance of these designs through beam tests.

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