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High-sensitivity RF direct sampling processor redefines the beam diagnostic system

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RF direct sampling and processing of beam signals has always been the goal pursued in beam diagnostic systems. Now it's time to make it happen. For the first time, a high-sensitivity RF direct sampling processor has been developed for C-band cavity pickups in SHINE/SXFEL. It redefines the beam diagnostic system. There is no longer a need for complex analog down-conversion modules in traditional cavity BPM/BAM systems. In addition, the processor can simultaneously meet the signal processing needs of different cavities with a center frequency below 6 GHz. Obviously, the RF direct sampling processor greatly reduces the complexity and costs of the system, shows great versatility. Meanwhile, compared to the down-conversion electronics, this processor demonstrates much higher sensitivity (twice) due to a significant reduction in analog components. The processor also has a huge advantage in other beam diagnostics because of its wide bandwidth and high sampling rate, such as bunch-by-bunch measurement and feedback system on synchrotron radiation facility. Now it's time to massively apply the RF direct sampling processor to promote the development of beam diagnostic technology.

Footnotes

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