

At SPring-8, a bunch-by-bunch transverse feedback processor has been developed to address hybrid fillings with significant differences in bunch current. This system has been operational since 2016. The SPring-8's standard operational modes include hybrid fillings, where high-bunch-current singlet bunches coexist with low-bunch-current bunch trains, and one of these hybrid fillings had a 50-fold difference in bunch current. In such hybrid filling, feedback is required to suppress single-bunch instabilities of high-bunch-current singlets and multi-bunch instabilities of low-bunch current trains simultaneously. However, the signal from BPM is proportional to bunch current; therefore, there is such a big difference in signal strength. With the conventional feedback system using a single RF front-end circuit, the signal saturates the front-end circuit for high bunch current, or there is too low feedback gain and low resolution in ADC data for low-bunch current. To overcome this, the SPring-8 feedback system employs multiple sets of RF front-end and ADC with different gain, and chooses the adequate one corresponding to the bunch current measured with the processor on a bunch-by-bunch basis.