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PO39 - RF Control for Suppression of Beam Instabilities due to Accelerating Mode in SuperKEKB

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“SuperKEKB aims for high luminosity on the order of $10^{35} \text{ cm}^{-2}\text{s}^{-1}$ with high beam currents of 2.6 A for electron and 3.6 A for positron to search a new physics beyond the Standard Model in the B meson regime. In recent operations, we achieved new record of the luminosity of $4.7 \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$ with 1.1 A for electron and 1.3 A for positron.

For high current beam storage, beam instabilities due to accelerating mode is one of the significant issues in RF System, although the accelerating mode of an RF cavity is indispensable for acceleration. Therefore the beam instabilities must be suppressed by advanced RF signal control with acceleration voltage control.

In the SuperKEKB operation, direct RF feedback control technique is applied for suppression of the static Robinson instability into the cavity voltage control loop. Additionally, advanced damper system of coupled bunch instability is adopted in the RF control. The details and tuning method of the RF control system for suppression of the beam instabilities will be presented, and the performance of the system in the beam operation will be also reported.”

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Session Classification: Poster / Demo Sessions