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The study of single bunch instability at the Taiwan Photon Source

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Single-bunch instability is studied at the Taiwan Photon Source both with and without bunch-by-bunch feedback (BBF). The instability thresholds are investigated at various chromaticities by increasing the bunch current until the instability occurs. BBF and chromaticity can increase the maximum stored bunch current and allow the tune to cross the unstable region. As the bunch current increases, the tune around the betatron frequency decreases and the tune around the synchrotron sideband increases. High radiation doses are detected by beam loss monitors when the bunch current exceeds 2 mA, near the unstable region, originating from synchrotron light scattered by the photon absorber. As the single bunch becomes unstable, electron beam loss occurs after the first band magnet of the straight section with the smallest vertical aperture.

Footnotes

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Paper preparation format

Region represented

Asia

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