

SPring-8 Synchrotron

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Beam operation at SPring-8 booster-synchrotron began on December 10, 1996 and, one week later, the electron beam energy was successfully raised from 1 GeV to 8 GeV. Operations were then suspended for the regular SPring-8 winter shutdown and inspection. Beam tuning resumed on January 13, 1997, and the first beam extraction from the synchrotron took place on February 3. Orbit correction for the beam continued until February 12 and the synchrotron has since continued to operate smoothly.

Synchrotron tuning was completed successfully on March 11. On March 13, the SPring-8 synchrotron to storage ring beam transport (SSBT) line made its first beam transfer. After achieving injection into the storage ring, it was possible to conduct beam studies in the synchrotron.

These have mainly concerned the RF-knockout system that scrapes the electron beam's satellite bunch [ref. 1]. And it was verified that single-bunch mode had been achieved in the synchrotron. A single-bunch beam became available to users on November 21. As Figure 1 shows, beam impurity was less than 10^{-6} in usual user-time mode. Single bunch beam impurity was measured at Beam Line BL09 using the photon counting method.

There were problems with some of SSBT magnet power supplies. But, as storage ring beam operation had just begun, it was not possible to close down the SSBT magnets. Temporary repairs were carried out between injections to the storage ring. Full repairs were completed during the 1997 summer

shutdown.

Operation of the booster synchrotron has been stable. Figure 2 shows RF and magnet power equipment operation times. During calendar year 1997, the total operation times for RF and bending magnets were 4,700 and 3,800 hours, respectively.

Reference;

[1] H. Suzuki et al; SRI 97

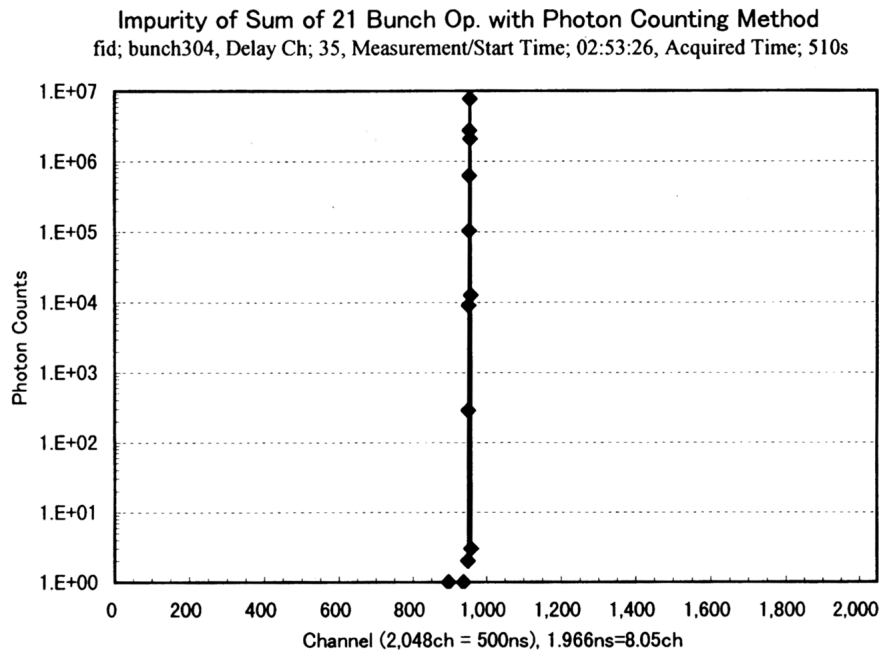


Figure 1: Single bunch beam impurity measurement using the photon-counting method. Time interval between beam bunches is 1.966 ns, given by an acceleration frequency is 508.58 MHz. We can not recognize the beam between bunch positions. Total peak photon count is 1.3×10^7 .

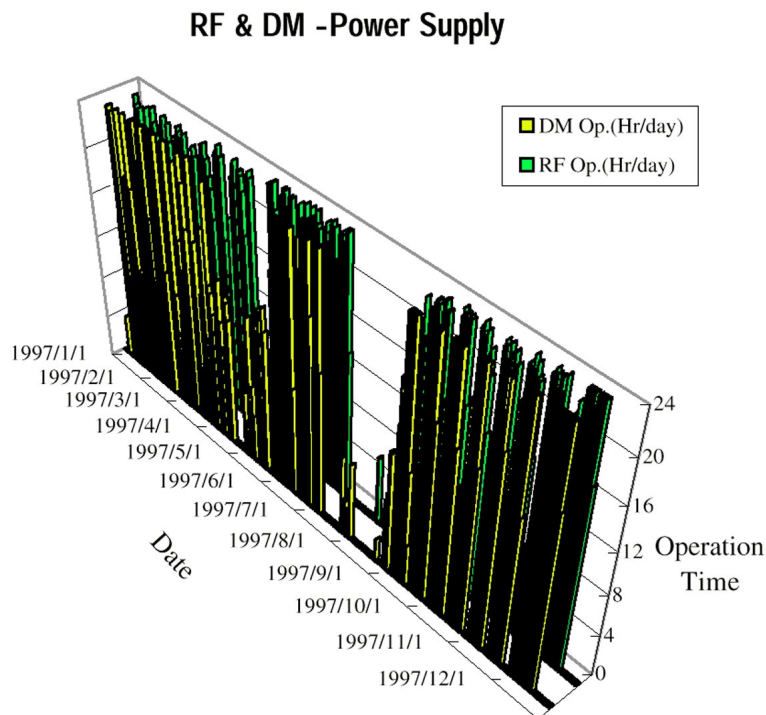


Figure 2; Operation times of RF and magnet power equipment in 1997, when almost all of the synchrotron equipment had been prepared to supply the a beam to the storage ring.