Status of Operation Reliability at the SPring-8 Storage Ring

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Introduction

In light source storage rings, the beam availability is used as a measure of operation reliability, which is primarily regulated by the beam current. However, there are other barometers for availability, which measure the beam performance promised to the users. For example, the beam profile, or the emittance coupling, is the important parameter for the brilliant light source facilities. The bunch impurity and the current irregularity relating to the bunch filling mode are other essential parameters for time resolved experiments. Here we report the metrics and the status for the operation reliability of the SPring-8 storage ring.

Operation Statistics

User Time in Last Decade

Beam Availability in Last Decade

Status of Top-up Operation

To keep the stored current constant, the beam is frequently injected during user time.

Stored Beam Stability: 0.03%
Target Stored Current: 99.5 mA
Injection Current: 30 µA
Shot # per Injection: 1

Top-up Availability (Time with Stored Current > 99.4 mA / User Time)

Status of Bunch Filling Mode

Bunch Purity

Impurity: Ratio of Satellite Bunch to Main Bunch

User Request for Single Bunch Impurity: < 10^{-8}

Beam Profile

For light source storage rings, beam profile parameters, especially vertical beam size and beam tilt, are essential. Vertical beam size easily changes due to the error field of insertion devices.

X-ray Pin Hole Camera

2-dim. Visible Light Interferometer

Stored Beam Orbit

Orbit stability is crucial for synchrotron radiation facilities. To keep orbit constant, slow feedback with 1 Hz is running during user operation.

Fast Beam Position Monitor

Display for COD Correction

Auto COD Correction Control GUI

Trend Graph of COD Drift

User Request for Irregularity of Single Bunch Current: < 10 %