SuperKEKB Injector Linac Overview

- High bunch charge (4 nC), low emittance (20 μm), small energy spread
- Simultaneous top-up injection for 5 independent rings (SKB e-/e+, e+ damping ring PF, PF-AR) with different beam energies.

EPICS based Control System
- EPICS Channel Archiver, CSS Archiver, CSS Alarm
- Server machines (x17)
- CentOS 5.10 (x86_64)
- HP blade BL460c G1/G8/G9, BL680c G5, 1U/2U server
- Storage: NetApp FAS3220, FAS2040, FAS2020

Project management tool Redmine and Git SCM are very effective for pushing the productivity of linac control group.

Low Emittance Preservation for e- Beam

- Component misalignment (Accelerating structure, Q-Mag.) causes the serious emittance growth.
- Simulation was carried out for the 500-m-long straight line (5 nC, initial emittance 10 mm·mrad with various misalignments of the accelerating structures and quadrupole magnets)
- Precise beam position measurement and control => Important issues

- The electron beam of short bunch length can mitigate the transverse wake field and eventually can avoid the significant emittance growth. However, it may cause the large energy spread if the longitudinal bunch shape is Gaussian. The rectangular like longitudinal bunch shape can keep the small energy spread beam.

Event Based Timing Control System

- MRF: VME EVG 230 x3, EVR-230RF x46, PXI EVR-230 x13
- VME 64x based, VxWorks 6.8.

Beam Monitor Control System

- SuperKEKB injector linac control system is based on the EPICS framework. We manage about 150 EPICS IOCs and about 50,000 PVs.
- The new BPM readout system based on a double width VME card w/ the precision of about 10 μm (1σ).
- The PXI based EVR 230 system is implemented for the pulsed steering and quadrupole magnet controls, now under test. It will be applied for the real beam operation in this October 10th.
- Project management tool Redmine and Git SCM are very effective for pushing the productivity of linac control group.