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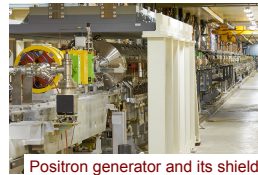
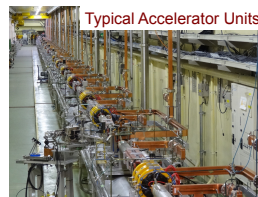
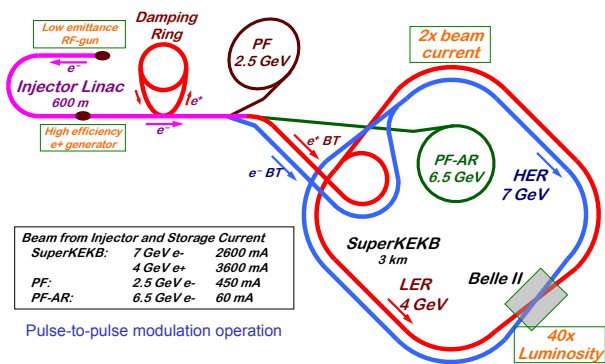
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KEK injector linac has delivered electrons and positrons for particle physics and photon science experiments for more than 30 years. It is being upgraded for the SuperKEKB project, which aims at a 40-fold increase in luminosity over the previous project KEKB, in order to increase our understanding of flavor physics beyond the standard model of elementary particle physics. SuperKEKB energy-asymmetric electron and positron collider with its extremely high luminosity requires a high current, low emittance and low energy spread injection beam from the injector. The

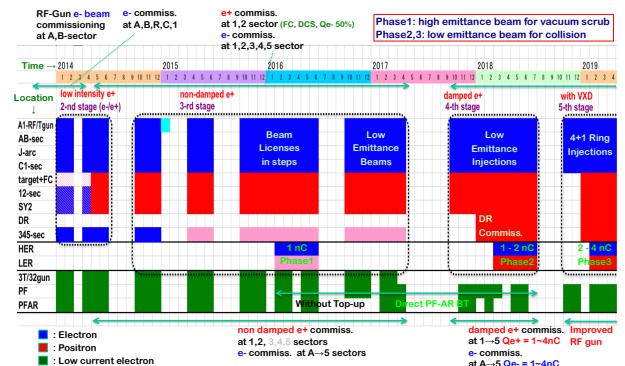
electron beams will be generated by a new type of RF gun, that provides a much higher beam current to correspond to a large stored beam current and a short lifetime in the ring. The positron source is another major challenge that enhances the positron bunch intensity from 1 to 4 nC by increasing the positron capture efficiency, and the positron beam emittance is reduced from 2000 μm to 10 μm in the vertical plane by introducing a damping ring, followed by the bunch compressor and energy compressor. The summary of the rejuvenation is reported.

e^- / e^+ Injector rejuvenation with high-intensity and low-emittance beams towards 40-times higher luminosity, operating for Phase-II commissioning

SuperKEKB Electron/Positron Complex



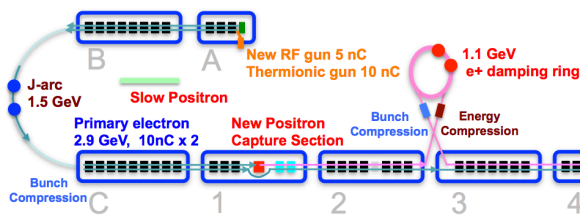
Balanced Schedule for Improvements / Stability



SuperKEKB particle physics

- ◆ Long-term and fixed users
- ◆ Performance intensive (Integrated performance)
- ◆ Minimum preventive maintenance
- ◆ Invests on improvements
- ◆ May share common goal with users
- ◆ Everyday is new
- ◆ On-the-job training for operators

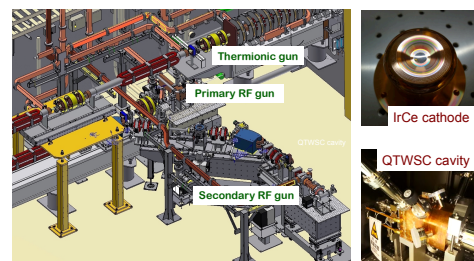
Injector Linac



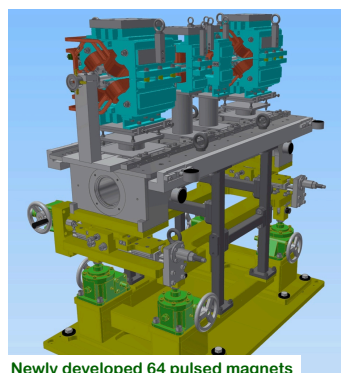
PF / PF-AR photon science

- ◆ Short-term in many groups
- ◆ Stability intensive (Hates failures)
- ◆ Deliberate scheduled maintenance
- ◆ Invests on maintenance
- ◆ Distance from users
- ◆ Fixed procedures
- ◆ Difficult to train operators

High-current Low-emittance RF Gun



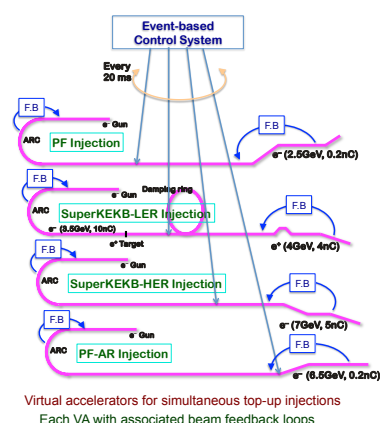
High-performance Pulsed Magnets



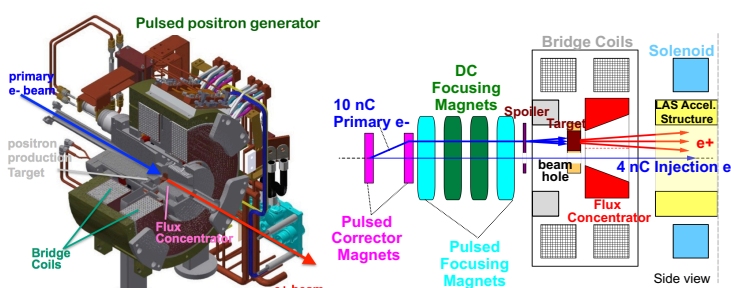
Rejuvenated Injector Linac



Synchronized Global Controls



High-current Positron Generator



Summary

- ◆ Injector linac has been rejuvenated since 2010, and is close to its completion.
- ◆ It successfully injected required electrons and positrons in SuperKEKB phase 1 & 2 commissioning.
- ◆ It maintained light source injections during rejuvenation.
- ◆ It is expected to improve for Phase 3 commissioning.