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Status of SuperKEKB construction

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SuperKEKB is a major upgrade of the asymmetric B-factory collider, KEKB, to provide a 40 times higher luminosity than that achieved at KEKB. The design of SuperKEKB adopted the nano-beam scheme for the collision of two beams which was originally proposed for Italian Super B Factory. This scheme uses a nano-scale beam size (the vertical size is 50 nm and horizontal size is ~ 0.01 mm) and a large crossing angle at the interaction point. The nano-scale beam size is realized with a low emittance optics and very small beta function at the collision point. For the low emittance design, a substantial part of the positron ring (LER) was reconstructed. All dipole magnets of LER were replaced with longer ones. The beam pipes of LER were renewed to mitigate the electron cloud problem. Around the interaction point, about 300 m region of both rings was completely redesigned for the new collision scheme.

In various aspects, the nano-beam scheme SuperKEKB is a challenging accelerator. The final focusing superconducting magnets are unprecedentedly compact. The tolerances for the hardware to realize a nano-scale beam size and to keep the collision are very tight. And optics design is still looking for a wider dynamic aperture.

The present status of these challenging upgrades and a commissioning strategy will be reported.

Summary

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