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Novel Accelerator Methods and Technologies for KEKB Upgrade

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The KEKB B factory is being upgraded to search for physics beyond the Standard Model, with a target luminosity of $8 \times 10^{35} \text{ cm}^{-2} \text{ s}^{-1}$, a factor of 40 times greater than the world record luminosity achieved at KEKB. To achieve this target luminosity the upgraded machine, SuperKEKB, will require the use of new advances in accelerator technology, among them the development of a low-emittance, high-bunch-charge injector system, a high-beam-current vacuum system incorporating the latest electron-cloud mitigation techniques, an interaction region design that provides a low beta function at the collision point while minimizing emittance growth due to fringe fields and maximizing the dynamic aperture, and beam diagnostics and feedback for monitoring and controlling low-emittance beams and their collisions. This talk will discuss the design challenges facing SuperKEKB, and the technologies that are being developed to meet them.

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