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SuperKEKB status and experience with collisions at large Piwinski angle

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SuperKEKB is an asymmetric circular e+e- collider operated with low emittance 3nm(x) and 10pm (y) and extremely low beta 30mm(x) and 0.3mm(y). Beam-beam collision is executed 15 mrad in half angle and Piwinski angle is 26. In commissioning at 2019 summer, SuperKEKB is operated with the design emittance (~1% coupling) and $b_x=100-200\text{mm}$ $b_y=3\text{mm}$. Piwinski angle is 10. Luminosity performance is insufficient, the beam-beam parameter calculated by luminosity is ~0.02. We struggle against optics aberration at IP to improve luminosity performance. Optics aberration is more serious for squeezing beta

Coherent beam-beam head-tail (BBHT) instability is another topic. Crossing angle induces synchro-beta instability coupled to two beams. The instability should be serious in FCCee.

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