Status and Prospects of KEKB

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1. Features of KEKB

2. Commissioning history & Present performance

3. Issues
   - finite angle crossing & crab cavities
   - stored current & masks
   - beam blow-up in LER

4. Future prospects
KEK B-Factory (KEKB)

3.5 GeV(e⁺) x 8 GeV(e⁻)
2-ring, asymmetric collider

design luminosity
1 x 10³⁴ cm⁻² s⁻¹

Features:
- 5-year project (94-98)
- budget 380 x 10⁸ yen
- in TRISTAN tunnel
- BELLE at IP
- finite-angle crossing of
  2 x 11 mrad at IP
- crab crossing scheme (future)
$2.4 \times 10^{23}$

0.7 cm

0.65 0.86

1150 2.4

0.04 ± 0.02
KEKB Parameters

- 3.5 GeV(e\(^+)\) x 8 GeV(e\(^-\))
- 3016 m circumference
- Luminoisty \(10^{34} \text{ cm}^{-2}\text{s}^{-1}\)
- Beam-beam tuneshift \(\xi = 0.05\)
- \(\beta_y^* = 1 \text{ cm}\)
- \(\sigma_x = 90 \mu\text{m}, \sigma_y = 1.9 \mu\text{m}\)
- Currents 1.1 A(e\(^-\)), 2.6 A(e\(^+\))
- 5000 bunches with 0.6 m spacing
- Crossing at 2 x 11 mrad at IP
Interaction Region

1. 2 x 11 mrad finite-angle crossing at IP to simplify IR and fill every bucket with beam.

2. Superconducting final-focus quads and anti-solenoids inside 1.5 Tesla BELLE detector solenoid.

3. Crab-crossing scheme as a fall-back option. Superconducting crab cavities are being developed.
Finite Angle Crossing @ IP

KKEK
White angle crossing

PEP-II
Mean-on collision

Shorter bunch spacing
No parasitic collisions
No synchrotron radiation due to the bend
No strong separation bend at IP
RF system

- Number of cavities:

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- ARES and SCC are working without any problems

- 380 kW is delivered by a SCC

- Breakdowns of SCC is quite rare
HER (left), LER (Right)

ARES (Normal conducting RF for LER, left), HER (Right)

Superconducting RF