BEPCII : Major Upgrade of the Beijing Electron-Positron Collider

BEPCII Team

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The major upgrade of the Beijing Electron-Positron Collider (BEPCII) is one of China's key projects. It is a double ring e^+-e^- collider as well as a synchrotron radiation (SR) source with its outer ring, or SR ring. Construction of BEPCII started in the beginning of 2004. Installation of the storage ring components completed in October 2007. The commissioning of BEPCII started in June 2008 together with BESIII detector. The luminosity increased step by step and reached 1/3 of design value in May 2009. The collider has been in routine operation since November 2009.

Beam energy range	1–2.1 GeV
Optimized beam energy	1.89GeV
Luminosity @ 1.89 GeV	1×10^{33} cm^{-2}s^{-1}
Injection from linac	Full energy injection: E_{inj}=1.55–1.89GeV Positron injection rate > 50 mA/min
Dedicated SR operation	250 mA @ 2.5 GeV

Strategy of luminosity upgrade

Double-ring: multi-bunch, k_b=1 ➔ 93

Choose large ε_x & optimum param.: I_b=9.75mA, ξ_y=0.04

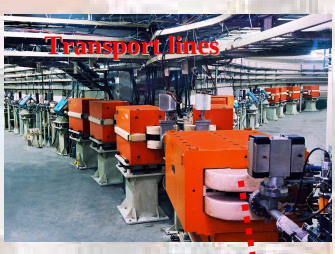
$$L(\text{cm}^{-2}\text{s}^{-1}) = 2.17\times10^{34}(1+R)\xi_y\frac{E(GeV)k_bI_b(A)}{\beta_y^*(cm)}$$

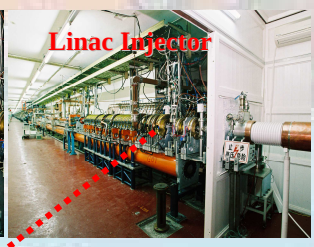
Micro-β: β_y^* =5cm ➔ 1.5 cm SC insertion quads

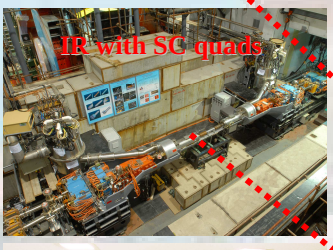
Reduce impedance +SC RF σ_z =5cm ➔ <1.5cm

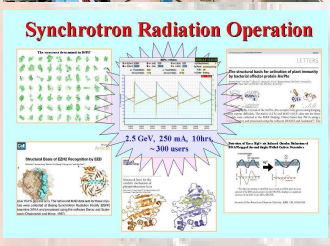
$(L_{BEPCII}/L_{BEPC})_{D.R.}=(5.5/1.5)\times93\times9.8/35=96$

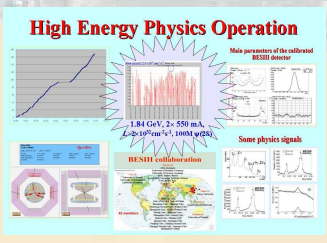
$L_{BEPC}=1.0\times10^{31}$ cm^{-2}s^{-1} ➔ $L_{BEPCII}=1\times10^{33}$ cm^{-2}s^{-1}











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