## **BEP**CII : Major Upgrade of the aseps Berjing Electron-Positron Collider<sup>4, 26, 2010</sup>

**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<sup>+</sup>-e<sup>-</sup> 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	Strategy of luminosity upgrade
Optimized beam energy	1.89GeV	<b>Double-ring:</b> multi-bunch, $\underline{k}_{41} = 1 \Rightarrow 93$ Choose large $\boldsymbol{e}_{x}$ & optimum param.: $I_{b} = 9.75 \text{mA}, \boldsymbol{\xi}_{y} = 0.04$
Luminosity @ 1.89 GeV	1×10 <sup>33</sup> cm <sup>-2</sup> s <sup>-1</sup>	$L(\text{cm}^{-2}\text{s}^{-1}) = 2.17 \times 10^{34} (1+R) \xi_y \frac{E(GeV) k_b I_b(A)}{\beta_y^*(cm)}$
Injection from linac	Full energy injection: $E_{inj}$ =1.55–1.89GeV Positron injection rate > 50 mA/min	<b>SC</b> insertion quads $\sigma_z = 5 \text{ cm} \Rightarrow <1.5 \text{ cm}$
Dedicated SR operation	250 mA @ 2.5 GeV	$(L_{BEPCII}/L_{BEPC})_{D.R.} = (5.5/1.5) \times 93 \times 9.8/35 = 96$ $L_{BEPC} = 1.0 \times 10^{-31} \text{ cm}^{-2} \text{s}^{-1} \rightarrow L_{BEPCII} = 1 \times 10^{-33} \text{ cm}^{-2} \text{s}^{-1}$
SC cavity in the enre		Pesiterer for the second secon
PR with SC grads	The Beijing Electron-Positron Collid 1. BESIII hall 2. BESIII control room 3. Power supply hall 4. RF station 5. Noth IR hall 6. Storage ring Tunnel 7. Transport line tunnel 8. Linac tunnel 10	er (BEPCI)
SR beamines & experimental staff		9. Klystron gallery 10. Mucleau nhrsics hall 11. T.L. power supply hall 12. East SR hall 13. West SR hall
Synchrotron Radiation Opera		High Energy Physics Operation High Phy

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