

# BEPCII luminosity sets world record as $1 \times 10^{33} / \text{cm}^2 / \text{s}$

April 14 2016



A new world record of BEPCII -- luminosity reaches  $1 \times 10^{33} / \text{cm}^2 / \text{s}$ . Credit: IHEP

At 22:29 pm, April 5<sup>th</sup>, the luminosity of the Beijing Electron Positron Collider (BEPCII) reached  $1 \times 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$ , a new landmark in the performance of the BEPCII— 100 times better than before it was upgraded. This is also the highest luminosity yet achieved for such an accelerator in this energy region.

After recovering from some faults in its hardware system and beginning high [energy](#) data taking at the BESIII detector earlier this year, BEPCII has been running in a quite good condition. From March 25<sup>th</sup>, scientists and technicians from the Institute of High Energy Physics (IHEP) started a new run of machine study at BEPCII. After commissioning of the [luminosity](#) day and night, they finally achieved this major breakthrough on April 5<sup>th</sup>.

BEPCII is a double-ring  $e^-e^+$  collider running at the tau-charm energy region ( $E_{\text{cm}} = 2.0\text{-}4.6 \text{ GeV}$ ), which, with a design luminosity of  $1 \times 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$  at the [beam energy](#) of 1.89 GeV, is an improvement of a factor of 100 over its successful predecessor, BEPC.

The installation of BEPCII was completed in the summer of 2005. The collider consists of two 237.5 m storage rings, one for electrons and one for positrons. They collide at the interaction point with a horizontal crossing angle of 11 mrad and a bunch spacing of 6 ~ 8 ns. Each ring can accommodate up to 120 bunches with a beam current of 910 mA. The machine will also provide a high flux and brightness of synchrotron radiation at a beam energy of 2.5 GeV with the dedicated synchrotron radiation mode.

In July 2008, the first collisions took place at BEPCII, and were observed by the new BESIII detector.

BEPCII passed the National Acceptance & Test organized by the National Development and Reform Commission in July 2009, marking

the successful completion of the Upgrade on schedule.

During the past years, the luminosity of the BEPCII was increased from  $5.21 \times 10^{32} \text{ cm}^{-2} \text{ s}^{-1}$  in 2010,  $6.49 \times 10^{32} \text{ cm}^{-2} \text{ s}^{-1}$  in 2011,  $7.08 \times 10^{32} \text{ cm}^{-2} \text{ s}^{-1}$  in 2013 and  $8.53 \times 10^{32} \text{ cm}^{-2} \text{ s}^{-1}$  in 2014.

The commissioning is still continuing, and we expect that more exciting news from BEPCII is still to come.

Provided by Chinese Academy of Sciences

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