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One of the important tendencies in the development of synchrotron radiation sources is low emmitance. Low emmitance storage rings could provide higher brilliance and better coherence, which are very important for almost all kinds of experiments in synchrotron radiation facilities. The 4th generation synchrotron radiation facilities can provide 2 or 3 orders of higher brilliance and coherence comparing with 3rd generation ones.
In the meantime, the successful construction of Shanghai Synchrotron Radiation Facility and the great achievements in the research in this facility, inspire the users to build the new and high-performance light sources in China. In the view point of regional factors, the vast in territory of China requires the reasonable distribution of synchrotron radiation facilities which support the scientific and technological research, in order to farthest satisfy the demands of users from different regions.
Based on the above reasons, we are building a new synchrotron radiation facility in the region around Beijing: High Energy Photon Source (HEPS). The designed electron energy of HEPS is 6GeV and the emmitance is lower than 0.1nmrad. This machine can provide the hard X-ray with brilliance higher than 1022ph/s/mm2/mrad2/0.1%BW and photon energy higher than 300keV.
The construction of HEPS started in June 2019, including a 500MeV LINAC, a 6GeV booster, a 1360m-circunference storage ring, 14 public beamlines and 1 test optical beamline, as well as the auxiliary facilities and building. Before the start-up of HEPS, the R&D project (HEPS-TF) was supported during 2016-2019. The Platform for Advanced Photon Source (PAPS) was supported in 2017 in order to provide a field for technology research and the assembling of the instruments of HEPS.
The installation of LINAC started in March 2022, commissioning in March 2023. In June 2023, the electron energy of LINAC reached to 500MeV, and the bunch charge reached to 7nC.
The installation of booster started in August 2022, commissioning in July 2023. After 4 months of commissioning, the electron energy reached to 6GeV and bunch charge to 5nC, in November 2023.
The installation of storage ring started in February 2023. In July 23 2024, we started the commissioning of storage ring. Now the beam current can reach to 100mA and the emmitance was 56.8pmrad. The first synchrotron light from insertion device was firstly obtained in October 12, 2024.
During the installation of storage ring, the front-ends of beamlines were installed in Oct. 21, 2022. The first monochromator was installed in Dec. 15, 2023. The commissioning of beamlines were started in Sep. 2024.
In Oct. 29, 2025, HEPS passed the performance acceptance organized by the Chinese Academy of Sciences. A suite of world-class performance beamlines has been commissioned, such as state-of-the-art the hard x-ray imaging beamline and the structural dynamics beamline. Early experiments have fully demonstrated HEPS's exceptional capabilities: deep penetration, ultra-high brightness and coherence. HEPS is now poised to serve as a premier platform for original and innovative research across basic and engineering sciences and will open to global users in 2026.

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