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DESIGN AND COMMISSIONING OF THE NITROGEN CRYOGENIC SYSTEM FOR THE HEPS

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High Energy Photon Source (HEPS) is a high-performance and high-energy synchrotron radiation light source with a beam energy of 6GeV and an ultra-low emittance of better than 0.06nm×rad. The HEPS is mainly composed of accelerator, beamlines and end-stations. No less than 90 high performance beamlines and end-stations are capable to be built around the storage ring. The HEPS is scheduled to be put into operation in 2025 at Institute of High Energy Physics in China. A large nitrogen cryogenic system will support a liquid nitrogen cryogenic environment temperature for the HEPS. The nitrogen cryogenic system is crucial for creating and maintaining operational conditions of the thermal shield of superconducting radio frequency cavity cryomodules, precooling a 2.0kW@4.5K helium refrigerator, cooling photon beamline crystats and cryogenic inserts in the HEPS. The nitrogen cryogenic system has an average capacity about 50kW at 80K in the HEPS phase I. The nitrogen cryogenic system is mainly included of a large scale nitrogen cycle refrigerator, two liquid nitrogen tanks and a cryogenic fluid distribution tube network. The nitrogen cryogenic system project engineering implementation has started at June 2019. In this paper, the Schematic diagram, status and recent commissioning of the nitrogen cryogenic system are described.

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