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IHEP high efficiency, high power klystron development

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After the discovery of the Higgs boson at LHC, Chinese scientists have planned to build a “Great Collider,” which is a next-generation multinational particle accelerator research facility proposed as a circular electron-positron collider (CEPC) and a super proton-proton collider (SPPC). The CEPC synchrotron radiation power is supposed to be more than 60MW. Institute of High Energy Physics (IHEP) is developing a higher efficiency klystron of frequency 650 MHz/800 kW with an efficiency goal of around 80%. Several klystron prototypes have been manufactured in the last five years to achieve this goal. The prototype was developed in March 2020 with 62% efficiency at 800 kW pulsed output power. The first stage of the high-power test for the second prototype was also completed in July 2022 with 70.5% efficiency at 630 kW CW power. The third prototype (Multi-beam klystron) is being manufactured, and it will be tested by the middle of 2023. In addition, the beam dynamics of 2860MHz (80MW) klystron are completed and will be manufactured in 2023. The design of 5720 MHz (80 MW&50 MW) klystron for CEPC Linac is also in progress.

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