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Design and test of a S band TW buncher for the injector linac of HEPS

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The bunching system of injector Linac in High Energy Photon Source (HEPS) includes two sub-harmonic bunchers, a prebuncher and a traveling wave S band buncher. In this paper, the design and test of the traveling wave buncher are presented. The buncher is a 6-cell constant impedance traveling wave structure operating in $2\pi/3$ mode at 2998.8 MHz. The phase velocity is 0.75 times the velocity of light. First, the characteristic parameters are optimized in CST. The shunt impedance is 33.2 MV/m. The maximum bunching voltage is 1.2 MV with input power of about 5 MW. Then the buncher is precisely tuned and cold tested with a vector network analyzer after fabrication. Finally, the high power test was finished before installation in Linac. The buncher can operate stably with input power of 10 MW after a week of conditioning. So far the buncher has been applied successfully in Linac of HEPS.

Footnotes

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