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Bunch length measurement using a traveling wave RF deflector

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摘要

RF deflectors can be used for bunch length measurement with high resolution. This paper describes a completed S-band traveling wave RF deflector and the bunch length measurement of the electron beam produced by the photocathode RF gun of the Shanghai DUV-FEL facility. This is the first time that such a transverse RF deflector has been developed and used to measure the bunch length of picosecond order in China. The deflector's VSWR is 1.06, the whole attenuation 0.5 dB, and the bandwidth 4.77 MHz for VSWR less than 1.1. With a laser pulse width of 8.5 ps, beam energy of 4.2 MeV, and bunch charge of 0.64 nC, the bunch lengths for different RF input power into the deflector were measured, and an averaged rms bunch length of 5.25 ps was obtained. A YAG crystal is used as a screen downstream of the deflector, with the calibrated value of 1 pix=136 μm.

关键词

[RF deflector](#), [bunch length](#), [RF gun](#), [HEM₁₁ mode](#)

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