

Development of 1.2 Mega-Watt P-band Travelling Wave Resonant Ring

High power microwave devices, such as ceramic windows and waveguide valves, are critical components in accelerators, where safety and reliability are paramount. To ensure their safe operation, these devices must undergo rigorous high-power testing. The Traveling Wave Resonant Ring (TWRR) is an economical and efficient device used for such testing. The Institute of High Energy Physics (IHEP) is currently designing a TWRR at the P-band frequency to support the development of klystrons. The TWRR's main components include a directional coupler, observation window, phase shifter and load. The main directional coupler of the project has a coupling ratio of 10 dB; the directional coupler for power detection has a coupling ratio of 60 dB; and the overall loop gain is 35.9 times. This TWRR is capable of testing at 1.5 times the rated power of an 800-kW klystron, significantly reducing the risk of the window being penetrated during operation.

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