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Initial results for a 170 GHz high power ITER waveguide component test stand[1] TIMOTHY BIGELOW, ALAN BARKER, CARL DUKES, STEPHEN KILLOUGH, MICHAEL KAUFMAN, JOHN WHITE, GARY BELL, GREG HANSON, DAVE RASMUSSEN, Oak Ridge National Laboratory — A high power microwave test stand is being setup at ORNL to enable prototype testing of 170 GHz cw waveguide components being developed for the ITER ECH system. The ITER ECH system will utilize 63.5 mm diameter evacuated corrugated waveguide and will have 24 >150 m long runs. A 170 GHz 1 MW class gyrotron is being developed by Communications and Power Industries and is nearing completion. A HVDC power supply, water-cooling and control system has been partially tested in preparation for arrival of the gyrotron. The power supply and water-cooling system are being designed to operate for >3600 second pulses to simulate the operating conditions planned for the ITER ECH system. The gyrotron Gaussian beam output has a single mirror for focusing into a 63.5 mm corrugated waveguide in the vertical plane. The output beam and mirror are enclosed in an evacuated duct with absorber for stray radiation. Beam alignment with the waveguide is a critical task so a combination of mirror tilt adjustments and a bellows for offsets will be provided. Analysis of thermal patterns on thin witness plates will provide gyrotron mode purity and waveguide coupling efficiency data. Pre-prototype waveguide components and two dummy loads are available for initial operational testing of the gyrotron.

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