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Development

Theory Experiment

The ECE Diagnostic for ITER: Critical Testing and Component Selection,* M.E. Austin, *Univ. of Texas*; H.K.B. Pandya, *ITER-India*; R.F. Ellis *Univ. of Maryland*; R. Feder *PPPL*; A.E. Hubbard, *MIT*; W.L. Rowan, P.E. Phillips, *Univ. of Texas* — The US and India have developed designs for the front end optics, port plug components, transmission lines, and detection systems for EC emission which will provide T_e with high temporal resolution for ITER. Recent joint work focused on the transmission line. The ITER ECE diagnostic will require a broadband low-loss transmission system to propagate radiation from the tokamak to the diagnostic hall. Corrugated waveguide is a prime candidate for one critical component; however, there are well-founded concerns of losses at high frequencies due to mode conversion and Bragg scattering. Taking advantage of the unique availability of both a long waveguide run and a Michelson interferometer, an investigation of the losses was started at DIII-D. After benchmarking predictions to these measurements, extrapolation to the expected performance on ITER will be possible. These results will be compared with other transmission systems such as dielectric waveguide.

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