

# The Electron Bernstein Wave Emission Radiometer System for the TJ-II Stellarator\*

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Efficient Electron Bernstein wave (EBW) mode conversion is important for heating dense plasmas in TJ-II. The O-X-B mode conversion scenario is being considered for heating high density ( $>1.3 \times 10^{19} \text{ m}^{-3}$ ) and NBI heated plasmas [1]. Measurement of the thermal EBW emission from the plasma allows for a determination of the EBW mode conversion efficiency, and also provides an indication of the electron temperature evolution in overdense plasmas. A dual-polarized quad-ridged broadband horn will be used to measure the EBW emission at 28 GHz on TJ-II. Emission from the plasma is reflected from a steerable internal focusing mirror [2], propagates through a section of corrugated waveguide, and is then focused on the horn through a glass lens. A quarter wave plate, consisting of evenly spaced parallel metal plates, is used to help determine the degree of circular polarization. The field pattern from the horn-lens-waveguide combination has been measured as a function of horn-lens spacing and lens focal length with a 3-D scanning system in an effort to maximize coupling with the plasma. Details of the design, experimental results, and future plans will be presented.

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[1] F. Castejón et al. Fusion Science and Technology 46 (2004) 327

[2] A. Fernández et al. Fusion Science and Technology 46 (2004) 335