

Abstract Submitted
for the DPP02 Meeting of
The American Physical Society

Sorting Category: 5.6.7 (Experimental)

Coupling to the Electron Bernstein Wave With Waveguide Antennas: Theory and Experimental Results from MST¹

R.I. PINSKER, GA, M.D. CARTER, ORNL, C.B. FOREST, P.K. CHATTOPADHYAY, M. CENGHER, V. SVIDZINSKI, U. Wisconsin-

Madison — The electron Bernstein wave (EBW) is of interest for both diagnostic applications and for heating and current drive in low field devices such as present spherical torus experiments and the reversed-field pinch (RFP). In these devices, neither X- or O-modes can propagate in the interior of the plasma. We compare the predictions of a generalized waveguide coupling code [1] to the experimental results from the MST RFP in which a pair of S-band waveguides were oriented to excite the X-mode (which couples to the EBW near the upper hybrid resonance) in the edge of the plasma. Good qualitative agreement between the predicted phase dependence of the reflection coefficient and the measured results is obtained. In particular, the predicted strong dependence of the coupling on the sign of the toroidal phasing was observed.

[1] Pinsker, R.I., et al., in Radio Frequency Power in Plasmas (Proc. 14th Top. Conf., Oxnard, CA, 2001), (AIP, Melville, NY, 2001) p. 350.

¹Supported by US DOE Contracts DE-AC03-99ER54463, DE-AC05-00OR22725, and DE-FG03-96ER54373.

Prefer Oral Session
 Prefer Poster Session

R.I. Pinsker
pinsker@fusion.gat.com
General Atomics

Date submitted: July 19, 2002

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