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☐ Theory ☒ Experiment

Calculation of Direct Coupling to the Electron Bernstein Wave with Waveguide Antennas,* R.I. Pinsker, *General Atomics*, M.D. Carter, *ORNL*, C.B. Forest, *University of Wisconsin, Madison* —

Conventional electron cyclotron heating using the O- and X-modes to carry energy from the plasma edge to the cyclotron resonance layer is not possible for high density, low magnetic field devices (RFPs and STs, for example), since these modes are evanescent in most of the plasma. As an alternative, we consider coupling to the electron Bernstein wave (EBW) with a single waveguide, the mouth of which is inserted to the vicinity of the upper hybrid resonance. The calculation of the waveguide reflection coefficient is similar to the lower hybrid coupling problem solved by Brambilla,¹ but the character of the plasma surface admittance is quite different for the EBW than for the lower hybrid wave. Calculations are performed for two types of edge density profiles: (1) the density is taken to be zero then discontinuously jumps to a value higher than the upper hybrid resonance density, and (2) a smooth density profile connects very low density to the same final value. The surface admittance is calculated analytically for case (1), while the GLOSI code is used to compute the surface admittance in case (2). Remarkably, low reflection coefficients are found in certain situations in both models. The relevance of these results to near-term experiments will be discussed.

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¹M. Brambilla, Nucl. Fusion **16** (1976) 47.

☒ Prefer Poster Session
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