

Abstract Submitted
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Electron Bernstein wave emission measurements using a phased waveguide antenna on the Madison Symmetric Torus¹ S.M. MCMAHON, J.K. ANDERSON, C.B. FOREST, University of Wisconsin - Madison — Electromagnetic radiation in the electron cyclotron range of frequencies (ECRF) characteristic of blackbody emission has previously been observed on the Madison Symmetric Torus (MST) reversed field pinch (RFP). As the plasma in the RFP is overdense ($\Omega_{pe} \gg \Omega_{ce}$), the source of the measured radiation is core emitted electron Bernstein waves (EBW) which convert to electromagnetic waves at the plasma boundary. A diagnostic for measuring electron temperature profiles based on the EBW emission is being developed utilizing an antenna with finely adjustable angular resolution. A radiometer receives the emitted waves through a two-waveguide grill antenna designed for launching of power in the 2-4 GHz range. A phase difference imposed between the two arms of the antenna strongly affects the angular sensitivity. Analysis techniques considering frequency dependence and phase shift induced antenna patterns are used to infer temperature using previously developed theory of electromagnetic to EBW coupling efficiency.

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