Modeling of EBW Propagation and Damping in MST*

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Electron Bernstein waves (EBW) can be used for localized heating and current drive (CD) in overdense devices, such as the Madison Symmetric Torus (MST) reversed field pinch, located at the University of Wisconsin-Madison. Edge current profile modification via EBW injection is being explored to improve particle and energy transport in MST. Numerical modeling of EBW propagation and damping has been explored using the GENRAY ray-tracing code and CQL3D Fokker-Planck code in support of a 1 MW, 5.5 GHz EBW heating and current drive system under construction. Calculations were performed for EBWs launched with a 4.5 cm poloidal extent, -19 and -37 degrees below the midplane, to investigate off-axis current drive. Current was driven at r/a > 0.65 with a current drive efficiency > 10 kA/MW via the Ohkawa current drive method. The effect of large stochastic particle transport on CD efficiency was investigated by varying the radial transport model included in CQL3D. Additionally, CQL3D has been used to model the soft x-ray flux resulting from the EBW distortion of the electron distribution function, for comparison with experimental data.

*Work supported by USDOE.